

**An investigation of pricing and profitability in the short-stay
accommodation industry in Tasmania**

by

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B.A. Honours, (Durham), M.Sc. (London)

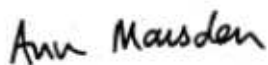
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for the degree of Doctor of Philosophy

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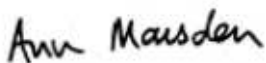
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Ann Marsden

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Abstract

Accommodation providers worldwide are readily observed to adopt a variety of pricing strategies. However there has not previously been an academic study of pricing in the Tasmanian industry. This thesis aims to provide a systematic study of the decisions made by short-stay accommodation providers in Tasmania, and the implications of these decisions on their profitability. Information on the Tasmanian short-stay accommodation industry was obtained from a survey of firms in this industry using a questionnaire designed by the researcher. The use of this method generates a novel data set, one that provides a broad overview of the practices in the industry. Data that would otherwise not be observable were obtained. Notably, innovations in the design of the questionnaire allowed the investigator to directly identify the elasticity of demand in sub-markets. Cost variables are likewise identified.

Data generated by the survey allow the following three analyses to be conducted:

1. The survey data reveal that firms in the short-stay accommodation industry use direct price discrimination by assessing the price sensitivity of groups of customers. These groups are identifiable by the firm and are based on the booking process chosen by the customer, whether they are a corporate or leisure customer and whether they are a repeat or first-visit customer. This result provides evidence that firms use third degree price discrimination in practice.
2. An analysis of the determinants of the firm's elasticity of demand is conducted. It is found that increases in the star rating (quality) of the firm reduces the elasticity of demand and an increase in the competitiveness of the environment in which the firm operates increases the elasticity of demand.
3. An analysis of the determinants of firm profitability is conducted. The analysis reveals that the use of the website Wotif.com by the firms is an important determinant of profitability in this industry. However the star rating of the firm, whether or not it is

the winter season, and the proportion of customers who make their bookings at the door are also found to be key determinants of profitability.

The conclusions from this study are of practical as well as academic interest. As with many regional areas, the short-stay accommodation industry in Tasmania is an important component of the local economy. Firms' pricing decisions will be an important determinant of their profitability. The success of these firms is of interest to their local communities and policy makers. The findings of this thesis are thus useful in informing policy discussion and analysis.

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1 Introduction

The way that firms make their pricing decisions is an area of economics that has generated considerable theoretical and empirical work. Pricing decisions by firms play a key role in the profitability of firms and are often the key to survival in an industry.¹ In this thesis the pricing strategies and profitability of firms in the short-stay accommodation industry in Tasmania are investigated. The investigation develops some of the ideas from the empirical research on pricing strategies and profitability in industrial economics, most of which have relied on secondary data.

Data for this investigation were collected from a group of firms using a questionnaire designed by the researcher. Because firm-level survey data is not often the basis for empirical research in industrial economics (Reid (1993) is an important exception), the present data collection is an important contribution of this thesis. As the researcher was able to ask firms directly about their pricing strategies and profitability this enabled research questions to be asked that would not generally be possible. By investigating pricing strategies and profitability using this approach, research questions could be investigated that have more general applications in firm-level industry studies. To the researcher's knowledge this is the first study of this kind into the pricing strategies and profitability in the short-stay accommodation industry.

1.1 Research aim

Short-stay accommodation providers worldwide are readily observed to adopt a variety of pricing strategies. The aim of the research is to develop an understanding of the pricing decisions of Tasmanian short-stay accommodation providers, and the implications of these decisions on their profitability. The industry was selected for the investigation because it provided an ideal candidate for a study of pricing strategies and profitability in an imperfectly competitive industry. The industry is a significant part of the local economy in Tasmania representing 5% of total industry revenue for the State.² Tasmania is also an island which helps in the definition of the short-stay accommodation market given there are clearly identifiable sea boundaries to the State.

¹ In line with the literature in industrial economics the term 'firm' is used wherever possible in this thesis. In some instances, where appropriate, the term 'business' is used. Hence the terms are used interchangeably but should be taken to describe the same type of operation.

² Australian Bureau of Statistics, 5206.6 State Final Demand, Detailed Components, Tasmania, June 2004.

Casual observation of a number of firms in the Tasmanian short-stay accommodation industry by the researcher over the period 2000 to 2005 indicated that prices varied according to how customers make their booking,³ the number of nights booked and the type of customer making the booking. This behaviour suggests that firms may be adopting price discrimination strategies.

Firms offer products which are imperfect substitutes for one another. Firms are geographically dispersed across the State. They range in size from operations with fewer than 5 rooms to more than 200 rooms, but with the industry dominated by relatively small operations. The industry also features a range of types of short-stay accommodation business, for example bed and breakfast, self contained and hotel accommodation. The quality of firms within the industry also varies, as measured by the AAA star rating method with unrated through to 5 star accommodations.⁴ Given these observed characteristics the industry is interpreted as being imperfectly competitive.

Over the period of observation between 2000 and 2005 an increasing number of firms adopted the use of electronic distribution channels. These channels offered firms the potential to more finely segment the market and also provided them with a new marketing platform. There was also growth in the industry with many new operators entering the industry,⁵ some of whom had made decisions to operate a short-stay accommodation business for lifestyle change reasons.⁶ Tasmania offered the option of relatively cheap real estate and an attractive environment for short-stay accommodation operators moving into the industry from mainland Australia.

The industry therefore provides an ideal candidate for a systematic study of pricing strategies and profitability in an imperfectly competitive industry. Understanding decision making by firms in the short-stay accommodation industry can also make a contribution to the information available for policy makers in this industry.

³ In the industry these booking channels are referred to as distribution channels.

⁴ AAA Tourism manages the running of the Australian accommodation star rating scheme. AAA is owned by Australia's seven Automobile Clubs

⁵ For the year ending June 2000 there were 4.9 million visitor nights compared to 7.2 million visitor nights for the year ending June 2004. Tasmanian Visitor Survey (TVS) quarter ending reports for September 2003, December 2003, March 2004 and June 2004

⁶ This comment is based on discussions with Tourism Tasmania in June 2005.

1.2 Using a survey to collect the data for the investigation

To investigate the pricing strategies and profitability required data that uncovers the decision making of firms. The extant data for the short-stay accommodation industry was found to be insufficiently detailed to be used for such an investigation. This lack of sufficiently detailed data provided the motivation for collecting data directly from the short-stay accommodation firms.

Three stages of fieldwork were involved. The first stage was a series of qualitative semi-structured interviews with industry representatives and firms. These interviews enabled the researcher to determine the extent to which firms would be able to answer questions about their pricing decisions. The interviews revealed that firms segmented their market according to how the customer booked and whether the customer was a corporate, leisure, first visit or return visit customer, and firms would be able to answer questions about these market segments. However it was judged less likely that firms would be able to answer questions about quantity discounting. The interviews revealed that a substantial fraction of the firms could not explain their motivation for offering quantity discounts, particularly in terms of generating maximum profit from high demand customers. However, questions about elasticity of demand and marginal cost could be answered if they were asked in a way that coincided with the approach they took to their own decision making. Profitability questions could generate a high completion rate if they were accompanied by guidance notes and assurance of confidentiality. The interviews also revealed that firms could be asked about their motivation for operating a short-stay accommodation business and about the importance of different measures in assessing the success of the business. Stage one of the fieldwork also enabled the researcher to identify a number of specific research questions associated with the pricing decision making of firms. These are set out below in Section 1.3.

Stage two of the fieldwork involved testing the questionnaire developed following the stage one interviews, using a pilot survey. The process of testing the questionnaire in the pilot survey enabled the specific research questions to be clarified. The pilot survey questionnaire was completed by 4% of the short-stay accommodation firms with five or more rooms. The responses provided the basis for revising the questionnaire instrument and also generated data used in the later econometric analysis in this thesis. The data from the pilot survey confirmed that firms could identify customers for the purposes of pricing decisions according to how the customer booked and whether the customer was a corporate, leisure, first visit or return visit customer. Respondents could also report the elasticity of demand and marginal costs

associated with these customer groups. Questions about profitability were successfully completed indicating that such questions could be included in the survey. In stage three of the fieldwork the revised questionnaire was used in a survey of all the short-stay accommodation firms with five or more rooms. The overall response rate including the responses from the pilot survey was 21%.⁷ The respondent group was not significantly different at the 5% level from the population of firms with five or more rooms.⁸ This finding established that the respondent group is a representative sample of the population. This representativeness means that the data can be used for statistical inference.

The key findings of the survey were that elasticity of demand, marginal cost and prices varied across the market segments according to how the customer booked and whether the customer was a corporate, leisure, first visit or return visit customer. Motivation for operating a short-stay accommodation firm also varied as did profitability. The variation confirmed that the specific research questions determined in stages 1 and 2 of the fieldwork could be tested using econometric methods. The questions are set out in the following section.

1.3 Specific research questions and the econometric analysis of these questions

The first research question arises from the observation of the different pricing strategies being used by firms which suggested that the firms could be using direct price discrimination.⁹ The question is;

1. *Do firms in the Tasmanian short-stay accommodation industry price in accordance with accepted theories of direct price discrimination?*

This question is investigated using a model of the industry that is imperfectly competitive. It is assumed that there is no entry or exit to the industry and therefore prices are observed in equilibrium. Price, elasticity and marginal cost data for each of the customer groups is generated from the survey and is used in a modified version of the Lerner index for the analysis of this first question. The customer groups, or market segments, correspond to how

⁷ It was possible to add the data from the pilot survey to the survey data because the questions in the pilot survey questionnaire contained sufficient of the core information for use in the analysis.

⁸ Tested using a Chi-squared test for equality of firm characteristic distribution functions across the respondent group and the population.

⁹ In the price discrimination literature direct price discrimination is also referred to as third degree price discrimination whereas indirect price discrimination is referred to as second degree or non-linear price discrimination. For the purposes of the analysis in this thesis direct price discrimination refers to third degree price discrimination where firms can identify customer groups and offer a linear price to the group based on the elasticity and marginal cost for that group.

the customer booked (the distribution channel used) and whether the customer is a corporate, leisure, first visit or return visit customer. Evidence of direct price discrimination based on these customer groups is found. The econometric analysis supports the hypothesis that firms use direct price discrimination strategies. In particular, the higher the elasticity of demand for a customer group, for example a distribution channel, the lower the price charged to that group.

As elasticity of demand across customer groups is a key determinant of the firm's ability to use direct price discrimination the next research question focuses on the determinants of the elasticity of demand. The question asks;

2. *What factors determine the elasticity of demand of market segments in the short-stay accommodation industry in Tasmania?*

This question considers the determinants of the equilibrium value of the elasticity of demand in each market segment. The determinants in the short-stay accommodation industry might include the location (region in Tasmania), the quality (measured by star rating) or size of the firm. They might also include the competitiveness of the market for individual firms.

A two stage approach and a reduced form specification based on the model developed for the first research question is used. The two stage approach is required because the model specified to investigate the second research question contains two endogenous variables, price and elasticity of demand. It is also necessary to control for marginal cost and the two stage approach makes this possible. The first stage involves estimating an hedonic price equation. The fitted price from the first stage is then used in the second stage equation to estimate the determinants of elasticity. The equilibrium value of the elasticity of demand increases as the market becomes more competitive, or if it is the winter season. Although the impact of the characteristics of the firm on elasticity are not directly estimated in the second stage their individual effect can be determined by considering the coefficients on the star rating and region variables in the first stage and on the fitted price variable in the second stage. Elasticity of demand is lower when firms have a higher star rating or are located in urban centres.

Finally the third research question builds on the first two questions which ask about pricing decisions and the ensuing pricing strategies by considering the profitability of firms in the short-stay accommodation industry. The third question is;

3. *What factors determine the profitability of firms in the short-stay accommodation industry in Tasmania?*

The model proposed for answering the first research question is again developed and used to answer this question. The development involves expressing profitability as a function of the exogenous variables in the model. Two equations are estimated; the first uses data from all the respondents the second uses data only from the owner operators. The latter estimation allows data on lifestyle decisions from the questionnaire to be used. Profitability for the data set from all respondents is found to be determined by; the star rating of the firm; whether it is a winter or summer season; the proportion of sales the firm makes at the door and whether the firm uses the site Wotif.com. The results indicate that profitability increases as the star rating falls and in the summer season. Where a firm makes more sales at the door or uses Wotif.com profitability is higher. The results from the estimation using just the data from the owner operators indicate that profitability increases as the star rating falls and in the summer season and that the decision to operate a business for lifestyle reasons indicates lower profitability. The use of Wotif.com also increases profitability for the owner operator respondents group.

There are two possible explanations for the positive association between the use of Wotif.com and profitability in both the estimations. Using Wotif.com provides a relatively easy way for firms to further segment the market and also to provide information about their prices electronically. Both strategies may increase profitability and it is not possible to definitively distinguish the impact of these two explanations for the increase in profitability associated with the use of Wotif.com. A hypothesis is however proposed to explain why some firms had adopted Wotif.com at the time of the survey and others had not adopted it. This hypothesis is based on the firm's costs of adoption of Wotif.com. The analysis suggests that where costs of adoption are low, firms use Wotif.com.

1.4 Significance and implications of the research

This thesis aims to make two contributions to the literature. The first concerns aspects of the methodology used in the investigation. The second concerns the findings from the investigation. The contribution of this research in the methodology area concerns the design of particular questions to investigate pricing strategies and profitability of firms. Although questionnaires have been designed and used to collect data on pricing strategies and

profitability of firms by previous researchers this is the first study, to my knowledge, that investigates price discrimination strategies in this way.

Two innovations in the design of the questionnaire are of note. These innovations concern the questions used to investigate the elasticity of demand and marginal cost variables for customer groups. These customer groups correspond to how the customer books and whether the customer is a corporate, leisure, first visit or return visit customer. The elasticity of demand and marginal cost variables can be difficult to estimate empirically because of identification issues when using sales and prices data, and issues with accounting data in the estimation of marginal cost.

The first innovation means that firms are asked about changes in revenue after a change in price rather than being asked about what happens to demand after a change in price. The fieldwork process revealed that this is a much easier way to ask about the elasticity of demand since it aligns more closely to the way firms think and make their decisions. Obtaining the elasticity of demand information in this way means that data are generated that might otherwise be impossible for firms to provide. The second innovation means that marginal cost is investigated by asking firms to consider only those costs that vary when a room night is sold. These are data that can be quite difficult to obtain from accounting data sources but is information that a firm can relatively easily provide.

The findings from these survey questions enable an econometric investigation which indicates that firms in the short-stay accommodation industry use direct price discrimination by assessing the price sensitivity of groups of customers. These groups are identifiable by the firm and are based on how the customer books, whether they are a corporate or leisure customer and whether they are a repeat or first-visit customer. Indirect price discrimination, such as discounts for more than one night, is also observed in this industry suggesting that customers vary in their willingness to purchase quantities of nights. However because many firms could not articulate their motivation for utilising quantity discounts it was not possible to test for indirect price discrimination. The results also reveal that the use of the website Wotif.com is an important determinant of profitability in this industry. However the star rating of the business, whether or not it is the winter season, and the proportion of customers who make their bookings at the door are also found to be key determinants of profitability.

1.5 Structure of the thesis

The thesis is structured around three broad headings; the context of the research, the methodology and data summary, and the econometric analysis of the data.

In Chapter 2, the first of the context chapters, the short-stay accommodation industry in Tasmania is described for the period of the study, July 2004 to June 2008. The changes in the industry are investigated in the context of the research questions. Extant data for this period is also described in this chapter. This description provides the motivation for the collection of primary data in the form of a survey. In Chapter 3, the second of the context chapters, the previous literature relating to the theoretical and empirical work on pricing strategies and profitability is investigated. Links are made in this chapter to the research questions. Chapter 3 also includes a discussion of the use of the survey method in relevant empirical studies in economics.

The methodology and data are described in Chapters 4 and 5. The process of collecting the primary data, including details of the population and the sampling method, are described in Chapter 4. In Chapter 5 the data collected from the pilot survey and the survey are described. Chapters 4 and 5 also include findings that came out of the process of collecting and describing the data which relate to firms' pricing decisions.

The results of the econometric analysis of the data from the survey and pilot survey are presented in Chapters 6 to 8. These chapters contain the analysis of the three specific research questions. In Chapter 6 the investigation of direct price discrimination based on a modified Lerner index is described. The investigation of the determinants of elasticity of demand using the reduced form specification and two stage procedure is described in Chapter 7. In the last of these three results chapters, Chapter 8, the investigation of the determinants of profitability is presented. Each chapter includes a discussion of the relevant research question and the *a priori* expectations regarding hypothesis tests. Details of the derivation of the estimating equations are presented followed by the econometric estimates and a discussion of those estimates.

The final chapter, Chapter 9, draws together conclusions and indicates areas for further research.¹⁰

¹⁰ Note that where percentages calculated from raw data are presented in this thesis these may not sum exactly to 100 because of rounding to zero decimal places.

2 The short-stay accommodation industry in Tasmania

This chapter is the first of two review chapters; it reviews the relevant extant data for the short-stay accommodation industry. The literature relevant to the research questions will then be reviewed in Chapter 3. The present review serves two purposes. It provides the context for consideration of the research questions posed in Chapter 1. It also facilitates an assessment of whether the extant data can be used to investigate the research questions – whether firms in the short-stay accommodation industry use price discrimination strategies, and what factors affect the elasticity of demand and the profitability of firms in this industry.

Data at the firm-level are required to investigate the research questions empirically. Four sources of data were available in June 2005 when the choices about how to empirically test the questions posed in Chapter 1 were made. Two of these sources, the Australian Bureau of Statistics (ABS) Tourist Accommodation, Small Area Data, Tasmania, and the Tasmanian Visitor Survey (TVS), are quarterly series. The third source, the Tourism Operators Survey, is an irregular survey and the fourth source is a one-off study, Yield Management for Small and Medium-Sized Accommodation Operators by D. Reid (1998). Investigation of the four data sources confirmed that, although the data sets provided useful background information, they were not sufficiently detailed to be used to test the research questions in Chapter 1.

2.1 Australian Bureau of Statistics (ABS) Tourist Accommodation, Small Area Data

The first of the quarterly data sets is the Australian Bureau of Statistics (ABS) Tourist Accommodation, Small Area Data, Tasmania, Quarterly Series 8635.6.55.001, June 2005. Data in this series provides information on capacity, occupancy, accommodation takings¹¹ and persons employed for the 291 tourist accommodation firms with 5 or more rooms that are licensed hotels, motels, guest houses or serviced apartments.¹² There are a number of limitations with these data in relation to testing the three research questions in this thesis. The data on accommodation takings (revenue) are not useful for examining price discrimination since separate price or quantity data are not collected in this series. There are also no explicit cost data in the series and although inferences about labour costs might be made from the ‘persons employed’ data labour costs are not the only variable costs faced by firms in this

¹¹ Takings are gross revenue from the provision of accommodation including GST. Takings from meals are excluded.

¹² The series reflects all customers of businesses classified as tourist accommodation businesses and therefore may include non- tourist customers, for example business customers.

industry so an imputation along these lines would be incomplete. In addition the series does not include bed and breakfast firms: in June 2005 these accounted for 19% of the short-stay accommodation firms with five or more rooms in Tasmania.¹³ However the major drawback with these data is that the firm-level data are aggregated to protect the anonymity of the respondents. It is not possible to obtain data on individual firms that could be used to investigate the research questions.

The data from the ABS series is, however, useful in that they provide an overview of the characteristics of the industry from a survey in which the response rate is close to 100%. Table 2.1 shows a breakdown of the characteristics of firms for the June quarter 2005 using four dimensions. These are firm type, region,¹⁴ number of rooms and star rating.¹⁵ Two of the three research questions ask about the factors that affect elasticity and profitability of firms in this industry. These factors could include the characteristics of firms. The ABS data provides a useful starting point for investigating these characteristics.

Table 2.1 shows that 80% of firms in this industry in the June quarter 2005 were hotels, motels and guest houses; just under half were in the regions ‘Hobart and Surrounds’ and ‘Launceston and Tamar Valley’; just under half had fewer than 15 rooms and 60% had a star rating of 3 stars and below (including unrated firms). These observations reflect an industry dominated by relatively small firms, concentrated in two urban centres with some variation in the type and star rating of the firms.

¹³ Based on information provided by Tourism Tasmania in June 2005.

¹⁴ The ABS region boundaries are shown in Appendix 1.

¹⁵ AAA Tourism manages the running of the Australian accommodation star rating scheme. AAA is owned by Australia’s seven Automobile Clubs.

Table 2.1 Distribution of characteristics of firms in Small Area Data, Tasmania

	Number	Percentage
Type		
Licensed hotels	107	37
Motels and guest houses	123	42
Serviced apartments	61	21
Total	291	
Region		
Hobart and Surrounds	80	27
Southern	21	7
East Coast	34	12
Northern	20	7
Launceston and Tamar Valley	59	20
North West	58	20
West Coast	19	7
Total	291	
Number of rooms		
5 to 14 rooms	137	47
15 or more rooms	154	53
Total	291	
Star rating		
2 star and below	35	12
3 star	116	40
4 star and above	117	40
unrated	23	8
Total	291	

Source: ABS 8635.6.55.001 - Tourist Accommodation, Small Area Data, Tasmania , June Quarter 2005

The data in Table 2.1 provide evidence of an imperfectly competitive industry where firms are able to differentiate their product based on the type, location, size and star rating of the business. The variation across firms in terms of characteristics suggests that these could be used to identify which factors affect the elasticity of demand and profitability. However the data in the ABS series do not provide information suitable for analysing the extent to which firms are using price discrimination – the first of the research questions. The Tasmanian Visitor Survey (TVS), the next extant data source considered, does provide background information relevant to this research question.

2.2 Tasmanian Visitor Survey

The second of the quarterly data series is the Tasmanian Visitor Survey (TVS).¹⁶ This series provides data on characteristics, travel behaviour and expenditure of international and domestic visitors to Tasmania. Approximately 70% of visitors in the June quarter 2005 reported that they used short-stay accommodation during their visit.¹⁷ As with the ABS series there are limitations with the TVS series for testing the first research question, which is whether firms price in accordance with accepted theories of direct price discrimination. Clearly, firm-level data are required for this purpose and, again, limitations arise from the aggregation in the TVS data. The expenditure data, for example, reflect the prices that visitors pay and the number of days they spend in short-stay accommodation but it is not possible to identify purchases from individual firms. Nevertheless the TVS series does provide relevant background information on the short-stay accommodation industry. Table 2.2 details the use of alternative distribution channels¹⁸ by visitors to the State during the period July 2000 to June 2005. To explain why the use of the distribution channels is relevant to the first research question it is helpful to explain how short-stay accommodation is bought and sold.¹⁹

Short-stay accommodation firms supply customers with a bed for one or more nights. This supply is described as a guest night (or visitor night) in the industry to distinguish the supply from a room night since rooms can be occupied by more than one person. Customers can make a booking for a guest night ahead of time or arrive at the accommodation business without a booking. Firms call the latter walk-ins. Where customers make a booking they have a choice of booking options. These different booking options, and the walk-in option, are called distribution channels by the firms in the industry. Where a customer does make a booking this is done directly with the firm by telephone, by facsimile or electronically or through an on-seller such as a travel agent, who makes the booking electronically, by telephone or by facsimile. If there is an on-seller involved between the customer and the firm, the on-seller receives a percentage of the revenue from the sale of the guest night. The firms call this percentage of revenue, commission. Since different prices can be offered for the same guest night across or within these distribution channels the firms potentially have the scope to use price discrimination strategies and increase their profitability. It is therefore

¹⁶ The Tasmanian Visitor Survey (TVS) is an exit survey of visitors to Tasmania by air or sea and is based on a sample of more than 9,000 visitors per year.

¹⁷ TVS quarter ending June 2005

¹⁸ Distribution channels are the route by which a customer makes a booking.

¹⁹ The description is based on information provided by Tourism Tasmania in June 2005.

interesting to observe any changes that occurred in the use of these distribution channels for the period July 2000 to June 2005 because such changes may indicate that firms are adjusting their pricing strategies.

Table 2.2 shows that the proportion of bookings made through a ‘travel agent’ declined from 44% to 27% whilst the proportion of bookings made through the ‘internet’ and ‘online only travel providers’ increased from 4% to 23%. For all other distribution channels the percentage of bookings remained relatively constant. The increased use of the internet and online only travel providers, and the decline in the use of travel agents presents an interesting finding in the light of the first research question. To explain why it is an interesting finding an explanation of the background to these distribution channels is presented.

The ‘travel agent channel’ was dominated during the period July 2000 to June 2005 by the company, Tasmania’s Temptations.²⁰ Each year the company issued a brochure that listed prices per guest night. Bookings were made by customers using travel retailers. The firms were charged 25% commission for any sale made through Tasmania’s Temptations via a retailer, split 50/50 between Tasmania’s Temptations and the retailer. The prices in the Tasmania’s Temptations brochure were set by firms well in advance of the publication of the brochure. For example, the brochure covering the period 1 September 2000 to 31 August 2001 had prices that were set by the firms on 31 August 1999. In most cases firms offered two options, a peak summer price and an off-peak discounted winter price. The size of the discount and period of the discount varied across firms. The contractual agreement with Tasmania’s Temptations did not allow for any further discounting from the prices advertised in the brochure although firms could sell directly by telephone, facsimile or at the door. Firms therefore had little flexibility in terms of pricing.

²⁰ This statement is based on information provided by Tourism Tasmania in June 2005. Tasmania’s Temptations was the wholesale accommodation business of Tourism Tasmania and closed on 30 September 2009. Until the end of the 1990s Tasmania’s Temptations was the primary way for Tasmanian travel and tourism products to be seen and bought in the national and international marketplace.

Table 2.2 Percentage of bookings by distribution channel

Distribution channel	July 2000 - June 2001	July 2001 - June 2002	July 2002 - June 2003	July 2003 - June 2004
Travel Agent	44	39	33	30
Airline	25	18	24	26
Tour Operator	3	3	3	3
Tasmanian Travel Centre	4	4	3	2
Motoring Club (eg. RACV, RACQ, NRMA, etc.)	2	1	1	1
TT Line (Spirit of Tasmania)	6	8	11	9
Called a Tasmanian free call number (July 2002-June 2006)	-	-	1	1
Internet (until June 2002)	4	16	-	-
Online only travel provider (e.g. Expedia.com, Wotif.com) (from July 2002)	-	-	10	14
Some other	3	3	2	4
No bookings made prior	1	3	1	2
No Response	9	5	10	8

Source: Tasmanian Visitors Survey (TVS) Tourism Tasmania.

The question used to generate this data in the TVS asked 'How was your travel to Tasmania booked?'

The data includes bookings made for car hire, activities and attractions in addition to accommodation.

The definition of the internet distribution channel was changed in July 2002 and re-specified as online only travel provider.

The second of the distribution channels, the internet and online only travel provider, was dominated during the period July 2000 to June 2005 by two companies,²¹ Expedia.com and Wotif.com.²² In comparison to the pricing on Tasmania's Temptations, prices on Expedia.com and Wotif.com could be adjusted from day to day so firms were no longer constrained to prices set in an earlier period. Firms were able to offer different prices on different days of the week or weeks of the year. The emergence of these internet and online only travel providers therefore allowed firms in the industry flexibility in their pricing that had not previously been possible. There are important differences between the two online sites which are reflected in differences in the commission that the two sites charge.²³ Expedia.com acts in a similar way to a traditional travel agent and bundles together flights with accommodation and car hire and charges a firm 25% for this service, whereas Wotif.com provides an online booking service for accommodation only and charges a firm 10%.

Initially Wotif.com only showed rates for the next seven days and these were often used by firms to sell distressed inventory at a discounted rate.²⁴ By February 2001 Wotif.com had extended their lead time to 14 days and in September 2005 to 28 days. Gradually the site became less a place that firms used for distressed inventory and more a place they used for selling all inventory. Although many firms were also using Tasmania's Temptations during the period that the use of the internet and online only travel providers was increasing, the wholesale company, Tasmania's Temptations, did not enforce the pricing in their contracts so the firms were able to take advantage of the flexibility offered by the online sites.

These changes in the distribution channels suggest three observations. First, note that by June 2005, many firms were in a position to offer different prices across and within distribution channels. If the cost of supplying a guest night is not reflected in these variations in price there may be evidence that firms use price discrimination strategies. This provides motivation for collecting cost data from the firms. The second observation is that the firms have an incentive to use Expedia.com and Wotif.com since these sites may allow the use of price discrimination strategies in comparison to the uniform pricing of Tasmania's Temptations. Third, firms have an incentive to use Wotif.com in preference to both Expedia.com and

²¹ This statement is based on information provided by Tourism Tasmania in June 2005.

²² Expedia.com began offering online travel services on the Microsoft Network in the United States in 1996 and by mid-1999 Expedia.com had a separate version of its site operating in Australia. Wotif.com was an Australian site launched in Brisbane in March 2000 which also offered the facility to book tourist accommodation online.

²³ The description of the differences is based on information provided by Tourism Tasmania in June 2005.

²⁴ Distressed inventory is inventory whose potential to be sold will soon pass.

Tasmania's Temptations. This is because they are charged 10% commission for the use of Wotif.com whereas Expedia.com and Tasmania's Temptations charge 25%. The post-commission price determines revenue and profitability so lower commission means higher revenue, *ceteris paribus*. Those firms who respond to these incentives should therefore be more profitable.

2.3 Tourism Operators Survey

The third extant data source is the Tourism Operators Survey (TOS). Tourism Tasmania ran this survey in 1993, 1994 and 1998. Financial, employment, marketing and customer service data were collected in the TOS from all tourism firms. Seven hundred and forty four tourism firms participated in the survey and 71% were tourism accommodation operators. The remaining 29% were firms running other tourism services. Although firms were not legally required to complete the questionnaire for the survey, Tourism Tasmania achieved a 91% response rate in the 1998 wave of the survey.

The data from the TOS were relatively dated by June 2005 and provided no information that could be used to test the three research questions. However the TOS did give an indication that firms in 1998 were able to provide financial information on turnover, expenditure on expansion or upgrading, current capital investment and planned investment. This financial information indicated that firms in the tourism industry could provide data to test the third research question on the factors that affect profitability. Although firms were able to provide such data the financial questions in the TOS achieved a slightly lower response than the other sections (between 75% and 86% depending on the question). The lower response rate suggests that either the firms found these questions more difficult to complete, or that they were reluctant to divulge such information to the questioner, or both. With regard to the difficulties in completing the questions, it can be noted that by July 2005 many more firms had electronic access to financial information than for the 1998 survey.²⁵ At the time of the 1988 survey 57% of firms used a computer in their business, 28% used email, 18% had a website and 14% permitted direct bookings from the website.²⁶ By June 2005 approximately 80% of firms were using email and most were, by that stage, linked electronically to the

²⁵ Based on data from the 1988 Tourism Operators Survey and information provided by Tourism Tasmania in June 2005.

²⁶ Tourism Operators Survey, 1988.

Tourism Tasmania Discover Tasmania website.²⁷ This finding suggested that, with changes in the adoption of electronic processes, financial information could be easier to provide by June 2005. On the second possible reason for the lower response rate, the survey in this thesis attempted to counter this by providing reassurance that data are confidential and anonymity preserved in any collection of financial information.

2.4 Yield Management for Small and Medium-Sized Accommodation Operators Study

The final extant data set is the Yield Management for Small and Medium-Sized Accommodation Operators Study commissioned by Tourism Tasmania in 1998. This study involved fifteen Tasmanian tourism accommodation operators. Over two financial years the tourism accommodation operators followed a common yield management approach to analyse their business, pinpoint problems and implement improvements to increase their financial return. Since the study involved such a small sample carried out some time ago it provided very little useful information, except that it provided an analysis of the process of revenue generation for short-stay or tourism accommodation operators and also gave an indication of the language and terms used by the firms in this industry. In this way, the study could be used to guide the survey design for this thesis.

2.5 Conclusions

In this chapter the four extant sources of data for the short-stay accommodation industry are explored. Although these four sources provide background information relevant to the research questions in Chapter 1, the data they provide lacks detail and currency. Although they reveal useful information regarding industry structure and modalities, primary data needs to be collected to investigate the research questions set out in Chapter 1. The next step is to investigate how other researchers have collected primary data, and how they have approached the empirical testing of questions about price discrimination and profitability. This is the subject of Chapter 3.

²⁷ The figure was provided by Tourism Tasmania in June 2005.

3 Survey of literature

This chapter forms the second of the review chapters, and surveys the literature relevant to the research questions in Chapter 1. As with Chapter 2 this chapter serves two purposes. The first purpose relates to the empirical analysis that researchers have completed on price discrimination and profitability. The literature survey in this chapter indicates that researchers have tested theories of price discrimination and profitability in imperfectly competitive industries. The previous chapter demonstrated that the short-stay accommodation industry in Tasmania is an imperfectly competitive industry in which firms may be using price discrimination strategies. It is possible therefore that empirical evidence of price discrimination may be found in the short-stay accommodation industry in Tasmania. The second purpose of the chapter is to investigate the data constraints that researchers investigating price discrimination and profitability have encountered. As was suggested by the review of available data for the short-stay accommodation industry in the previous chapter, the studies reviewed in this chapter are limited by the secondary data at their disposal. As such, collection of primary data represents a substantial innovation. The remainder of the chapter comprises three sections – the literature on empirical studies of price discrimination is considered in Section 3.1; literatures on profitability studies and the use of surveys are the subject of the latter two sections.

3.1 Price discrimination literature

The taxonomy describing price discrimination in monopoly markets was first introduced by A. Pigou (1920).²⁸ Third degree price discrimination theory was developed by J. Robinson (1933) and later by R. Schmalensee (1981) and H. Varian (1989) but there was little empirical investigation of price discrimination until the mid-1980s. There were many studies of pricing over the intervening period but these were primarily concerned with measuring monopoly power within industries or across industries. These studies reflect the development

²⁸ The modern textbook treatment of second-degree price discrimination as presented in J. Tirole (1988) and H. Varian (1989) differs from that identified by Pigou (1920). This is because Pigou (1920, 280) regarded both first and second-degree price discrimination as “...scarcely ever practicable” and “...of academic interest only” whereas many recent writers such as Tirole (1988) and Varian (1989) include self-selection via non-linear pricing as a form of second degree price discrimination. For the purposes of this review we follow more recent practice and third degree and first degree price discrimination are referred to as direct price discrimination. Second degree price discrimination is referred to as indirect price discrimination.

of the Structure-Conduct-Performance paradigm set out by J. Bain (1951). T. Bresnahan and Schmalensee (1987, 371) comment that “the 1980s saw a rebirth of interest and activity on the empirical side of industrial economics, stimulated in part by the wide-ranging and fundamental theoretical advances in the preceding decade”. L. Stole (2007) provides a comprehensive survey of the recent developments in price discrimination theory.

One of the first papers to appear in the 1980s is a study of direct (third degree) price discrimination by Y. Mertens and V. Ginsburgh (1985) who investigate the determinants of car prices in five European countries. Mertens and Ginsburgh note that

...under perfect competition, prices should reflect production costs, and hence depend on the technical characteristics of the commodities. Differences between list prices and prices explained by these characteristics result from market imperfections (like oligopoly power or discrimination) or product differentiation not accounted for by measurable characteristics (1985, 151).

Mertens and Ginsburgh obtained samples of 100 makes of car sold in five European countries and employed the technique developed by Griliches (1971) known as hedonic price regression. In this technique the price of a brand is assumed to be a function of its observable technical characteristics. To account for those characteristics that are difficult to measure the assumption had to be made that they can be proxied by technical characteristics of each brand. Mertens and Ginsburgh find differences in prices across countries which are due to both producer discrimination and product differentiation but are mainly due to price discriminating practices. They comment that “Clearly a careful study of the various price elasticities in these countries would help in interpreting the results, as would a deeper analysis of product differentiation” (Mertens and Ginsburgh, 1985, 165). Their study highlights the value that could be obtained from collecting price elasticity and cost data directly from firms rather than using secondary data sources.

M. Knetter (1989) takes a slightly different approach. He considers an imperfectly competitive model where US and German exporters use price discrimination strategies across destination markets. Knetter makes the point that “...an empirical analysis of goods prices and exchange rates must be capable of measuring either marginal cost or the mark-up over marginal cost” and “Either of these tasks poses formidable empirical problems” (Knetter, 1989, 198). He notes that “The traditional approach to the problem is direct measurement – the use of accounting data to measure marginal cost or the mark-up directly” and “The problems with using such data in economics are well - known” (Knetter, 1989, 199). If it is possible to ask firms directly about their marginal cost the problems associated with using

accounting data can be avoided. This possibility will be investigated in this thesis in Chapter 4.

A. Shepard (1991) also notes the difficulty of measurement highlighted by Knetter (1989). She comments that

While recent theory supports the possibility of price discrimination in multifirm markets, demonstrating that discrimination explains any observed price differential has been difficult. The empirical problem is distinguishing cost-based differentials from discriminatory differentials, a problem typically compounded by inadequate cost data. (1991, 31).

Shepard uses US microdata on gasoline retailing to test “The hypothesis that price discrimination based on willingness to pay for quality can occur in multifirm markets” (Shepard, 1991, 30). She approaches the measurement problem by exploiting “...a natural experiment in which firms differ in the ability to price discriminate but not in the cost of production” (Shepard, 1991, 31). Shepard considers two groups of petrol stations, those that offer full service and self-service petrol (multiproduct stations) and those that offer only self-service (single-product stations). She finds that “...gasoline stations seem to have sufficient local market power to allow multiproduct stations to price discriminate, maintaining price differentials approximately twice as large as the differential at other firms” (Shepard, 1991, 52). She notes that “...on average the price differential at multiproduct stations is 9c – 11c higher than the differential across single-product stations” (Shepard, 1991, 44). Shepard shows that raising the full service price is less costly in terms of lost customers for the multiproduct station because customers no longer willing to pay for full service switch to self-service at the same station.

The work by Shepard has interesting implications for the first two research questions in Chapter 1. As detailed in Chapter 2, firms in the short-stay accommodation industry in Tasmania supply guest nights using a number of different distribution channels. For example customers can purchase through a retailer or online intermediary. This is analogous to the full service and self-service facilities at multiproduct gas stations. There is an important difference however. In the case of the petrol station it is not possible to identify the characteristics of a full service or self-service customer. The firm in the short-stay accommodation industry may be able to identify characteristics of customers who prefer particular distribution channels. If they can do this and making the strong assumption of little

substitution across distribution channels then this is direct price discrimination whereas the petrol station pricing is indirect (second degree) price discrimination.

In a series of papers S. Borenstein (1985; 1991) and S. Borenstein and N. Rose (1994) also consider price discrimination in imperfectly competitive markets using a number of different approaches which are relevant to the first two research questions in Chapter 1. In the first of these papers Borenstein (1985) uses a computer simulation to investigate price discrimination in free-entry, zero profit markets. He uses a spatial model of monopolistic competition. Borenstein found that

If firms have access to a usable, though perhaps noisy, signal of customers' willingness to pay for their brand, equilibrium prices will almost certainly be discriminatory and... competition among heterogeneous brands and the absence of entry barriers will almost never prevent price discrimination, even when they cause long run profits to be driven to zero (1985, 380).

Borenstein (1985) uses a best response symmetry model where customers are sorted on the basis of either their strength of brand preferences or reservation prices. He finds that sorting on the basis of strength of brand preference produces larger price differentials, larger profits in the short run and more firms in long run equilibrium. A price discriminating firm in this model sets a higher price to the customer group with strong brand preferences and a lower price to the customer group with weak brand preferences relative to the uniform price. This evidence of price discrimination in markets with free entry is relevant to the short-stay accommodation industry. Where customers can be sorted into groups with strong or weak brand preferences it is likely that evidence of price discrimination will be found. The star rating system in Tasmania allows customers to identify the quality of firms.²⁹ If the use of the star rating system sorts customers by strength of brand preference this sorting may allow firms to use price discrimination in this industry.

The second paper by Borenstein (1991) considers the persistence of higher retail margins on unleaded than on leaded petrol during the 1980s in the US. He studies "a number of cost-based explanations for such gasoline pricing, as well as the possibility of price discrimination" (Borenstein, 1991, 354). He notes that price discrimination can persist in markets where firms are heterogeneous but that "Discrimination in these markets differs from monopoly price discrimination, because it can stem not only from variations in the buyers' valuations of the product, but also from variations in the buyers' willingness to switch sellers" (Borenstein, 1991, 355). Borenstein finds evidence of price discrimination where

²⁹ It is the only quality ranking system in use in the State and is managed by AAA Tourism.

petrol stations discriminate against customers who are less likely to switch stations and his conclusions highlight the influence of shopping or search costs on pricing decisions. This finding by Borenstein (1991) is relevant to the short-stay accommodation industry because it is possible to identify repeat customers, for example, who may be less willing to switch to another business.

Borenstein and Rose (1994) studied dispersion in prices charged by an airline for different passengers on the same route. They find considerable dispersion and attempt to distinguish price dispersion due to discriminatory practices from dispersion that results from variations in costs. Their results are broadly consistent with the model of price discrimination in monopolistically competitive markets found in Borenstein (1985). Borenstein and Rose found a significant and positive effect of competition on price dispersion. As the number of competitors in a market grew or the number of flights offered by each airline fell, price dispersion increased. They find that lower end fares may be more responsive to competition than higher end fares thus increasing price dispersion when the number of competitors increases. They observe that this finding is consistent with competitive-type price discrimination models where discrimination is based on customers' willingness to switch to alternative airlines or flights i.e. based on customers' cross elasticity of demand among specific brands. These results suggest that price discrimination may be observed in imperfectly competitive industries such as the short-stay accommodation industry where customers have differences in their willingness to switch firms. If repeat customers are less willing to switch firms than first-visit customers or customers who purchase on Wotif.com are less willing to switch firms than those purchasing through Tasmania's Temptations, for example, price discrimination may be observed in the short-stay accommodation industry. Interestingly for the work at hand, Borenstein and Rose note that the "...airlines that operated a computer reservation system (CRS) in 1986...generally exhibit a greater degree of price dispersion than those that did not operate CRSs" (Borenstein and Rose, 1994, 675). They comment

The result is consistent with the claim that a computer reservation system is complementary to utilization of sophisticated "yield management" techniques, that is, methods for allocating discount seats in a way that maximizes revenue on each flight. (1994, 675)

The finding on computer reservations systems suggests that those firms in the short-stay accommodation industry operating such a system are likely to have more dispersed prices. As noted in Chapter 2 the 1998 Yield Management for Small and Medium-Sized

Accommodation Operators Study was designed to encourage firms to adopt yield management techniques. By July 2005 many firms were operating these techniques by using sites such as Wotif.com, suggesting prices in the industry may be more dispersed than if no firms were using these techniques.

F. Verboven (1996, 2002) investigates price discrimination in imperfectly competitive markets in two papers. In the first of these papers he considers international car pricing and in the second, quality based price discrimination in the petrol and car markets. In the paper on car pricing Verboven (1996) constructs and estimates an oligopoly model in which three sources of international price discrimination are considered: price elasticities, import quota constraints and collusion. He considers "...multiproduct price-setting firms, selling differentiated products in geographically separated markets with import constraints" (Verboven, 1996, 240). He finds that international price discrimination, based on cross country differences in price elasticities, accounts for an important part of the observed differences in prices of cars across European countries. Verboven (1996) also comments that

Much of the discussion of the empirical results with regard to international price discrimination may be summarized by one summary statistic: the Lerner index...In traditional industry case studies, the mark-ups required to calculate the index are taken from (unreliable) accounting data. In the present study the mark-ups are inferred from observed pricing behavior (1996, 26)

This comment by Verboven (1996) is relevant to the investigation of the first two research questions in Chapter 1 which ask about price discrimination and the factors that affect the elasticity of demand. To investigate these questions will require analysis of the Lerner index using data on prices, elasticity of demand and marginal cost. Asking firms directly about their prices, elasticity of demand and marginal cost will allow mark-ups and the Lerner index to be calculated rather than being inferred as required in Verboven's study.

The second of the papers by Verboven (2002) reinforces the evidence that firms in an imperfectly competitive market are able to use price discrimination strategies. Verboven demonstrates this in his earlier paper (Verboven, 1996) on direct (third degree) price discrimination and in the later paper provides evidence of the use of indirect (second degree) price discrimination in competitive markets. Verboven finds that "The relative pricing of gasoline and diesel cars appears to be consistent with monopolistic price discrimination" (Verboven, 2002, 275). He develops a structural model of conduct that best fits the data which allows him to infer the presence of price discrimination. Verboven focuses on explaining the price differentials between diesel and petrol cars, based on the mileage of

customers, rather than producing a complete analysis of pricing. He notes that “...generally speaking, the price differential ... can be decomposed in a marginal cost difference ... and a mark-up difference...” (Verboven, 2002, 285). He uses this approach in his pricing specification for estimation. His results “...empirically demonstrate the feasibility and the importance of quality-based discrimination price discrimination in the presence of competition” (Verboven, 2002, 276). The papers by Verboven provide support for the work in this thesis in two areas. The first is that direct and indirect price discrimination can be observed in competitive markets. The second is the need to ask firms directly about marginal cost and mark-up to avoid having to make inferences about these variables in the investigation of the first two research questions in Chapter 1.

More recent studies of price discrimination in competitive markets are found in the papers by M. Busse and M. Rysman (2005) on competition and Yellow Pages advertising, C. Cabolis, S. Clerides, I. Ioannou and D. Senft (2007) on international price discrimination of textbooks and B. McManus (2007) on pricing in the specialty coffee market. Busse and Rysman identify that price discrimination exists where the price-cost ratio changes over the price schedule. They consider indirect price discrimination but, as with the earlier studies, Busse and Rysman could not observe the marginal cost of an advertisement so they took a difference in difference approach. They differenced across advertisement sizes and markets with different numbers of competitors. There are similarities in the approach taken by Busse and Rysman (2005) and Verboven (2002) in that in both cases it is the ratio of prices that are being considered. This is an approach that offers possibilities for the investigation of the first of the research questions in Chapter 1.

Busse and Rysman (2005) tested two hypotheses. The first is whether the price-cost ratio is smaller for advertising directories that face a larger number of competitors and the second is whether the slope of the price-cost ratio differs among firms facing different numbers of competitors. Busse and Rysman identify two types of customer, high valuation and low valuation customers where the high valuation customer purchases a greater quantity (larger advertisements) than the low valuation customer. They hypothesize “...that the extent of price discrimination between high and low valuation customers will vary with the competition the directory faces” (Busse and Rysman, 2005, 382). They find evidence of a positive association between lower prices and competition but that the association is not proportional along the range of product offerings where these offerings are the number of types of advertisements offered by the firm. They note that the price schedules generally

embody quantity discounts so the high valuation customers pay less per unit. They find that increased competition between directories is associated with an increased rate of discounting to the high valuation customers. This finding that price discrimination can exist in a competitive industry and an increase in competition increases the discount that the high valuation customer receives, could be tested in the short-stay accommodation industry where a high valuation customer is a customer who purchases more guest nights than a low valuation customer.

The second of the recent papers, which is by Cabolis et al. (2007), is similar to the Mertens and Ginsburgh (1985) paper as Cabolis et al. consider international price discrimination and also use the hedonic pricing approach. They “...tested for price differences by running a simple hedonic regression of price on book characteristics and on dummy variables that aim to capture differences across countries and book types” (Cabolis et al. 2007, 92). They point out that price differentials can arise from differences in cost, mark-ups or both. Cabolis et al. control for variations in cost by including the length of the book (number of pages) and the format (hardback or paperback) as explanatory variables in their hedonic regression. They document the existence of very large differences in prices of textbooks across countries and argue that cost factors cannot explain differentials of this magnitude and suggest that price differentials are almost exclusively demand-driven. This paper provides a further demonstration of the hedonic pricing approach to investigating price discrimination. This approach could be used to control for unobservable or unobtainable cost information, such as the marginal cost data in the Lerner index, for firms in the short-stay accommodation industry.

In the third of the recent papers, which is by McManus (2007) nonlinear pricing is considered. McManus collected data from nine specialty coffee shops on the University of Virginia campus. Using this data McManus estimates a structural utility model to compute consumers’ benefits from changing products’ sizes and then compares the estimated benefits to cost data. The changing products’ sizes refer to the size of a cup of coffee. His main focus is on distortions in product allocations and he finds

The estimated distortion patterns match some of the predictions from the theoretical literature...distortions are close to zero at the top of the product menu (largest sweet espresso) and bottom (smallest drip coffee), with larger positive benefit-cost margins in between. (McManus, 2007, 527)

As part of his investigation McManus considers the cost and price differences between two adjacent (in size) drinks within a line. He uses an approach similar to that taken by Busse and Rysman (2005) and Verboven (2002) by taking differences in prices and costs and considering price-cost ratio changes over price schedules. McManus notes that it is not necessary to obtain marginal cost data to perform his analysis since this information can be inferred. The structural model McManus uses also allows him to estimate differences in price elasticity of demand for those customers who select the same drink. If information about elasticity of demand and marginal cost can be obtained directly from firms in the short-stay accommodation industry, this will avoid the need to make inferences about marginal cost or to estimate price elasticity of demand.

The final paper in this section reviewing the relevant price discrimination literature is by P. Leslie (2004) and provides a link to the next section of the review, on profitability. The paper by Leslie is the only paper found that explicitly considers price discrimination and profitability for a monopolist operator. Leslie estimates a structural model of price discrimination using data he collected from a Broadway play. His model addresses direct and indirect price discrimination. Leslie notes that setting different seat prices for different seat qualities is an example of indirect price discrimination, while non-linear pricing and discount mail coupons targeted to consumers with lower willingness to pay are examples of direct discrimination. The sale of day-of-performance half price tickets sold at a discount booth is modelled by Leslie as a damaged good that further discriminates among self-selecting customers. Using a discrete choice random utility model he estimates a set of parameters within the demand system which he then uses to calculate own-price, cross-price and income elasticities. Leslie undertakes several counterfactual experiments based on the estimated demand system. He assumes the firm chooses prices to maximize expected revenue and finds that “The observed price discrimination in the Broadway theatre may improve the firm’s profit (revenue) by approximately 5% relative to a policy of optimal uniform pricing...” (Leslie, 2004, 520). Investigation of the research questions in Chapter 1 by asking firms directly about elasticity of demand and profitability, rather than using the approach taken by Leslie of estimation and calculation, could provide an alternative source of evidence of a positive relationship between price discrimination and profitability.

In summary this survey of the empirical price discrimination literature has highlighted a number of areas. The first is that obtaining data on marginal cost, mark-up or elasticity of demand is often very difficult, if not impossible, requiring researchers to use subtle and

inventive ways of obtaining such data. The second is that data on differences in prices and differences in costs have been used successfully in a number of studies to find evidence of price discrimination. The third is that evidence of direct and indirect degree price discrimination has been found in imperfectly competitive markets with free entry. These are all valuable findings that can be used in the development of the investigation of the questions in Chapter 1. The next step is to explore the literature on studies of profitability. This step is necessary because the use of price discrimination strategies is one way that firms can increase their profitability and is the focus of the third research question in Chapter 1.

3.2 Profitability literature

The earlier studies of profitability, originated from the work of E. Mason (1939;1949) and his colleagues at Harvard who introduced the Structure-Conduct-Performance (SCP) approach. As D. Carlton and J. Perloff (2005) note

In the SCP paradigm an industry's performance – its success in producing benefits for consumers – depends on the conduct or behavior of sellers and buyers, which depends on the structure of the market. The structure in turn depends on basic conditions such as technology and the demand for the product. (2005, 246)

During the 1930s and 1940s most of the empirical work in this area involved detailed case studies of particular organisations. This approach changed with the seminal work of Joseph Bain (1951;1956) who took an inter-industry, cross sectional approach. This approach was made possible by the post-war creation of government-supplied data. The SCP approach involves obtaining a measure of performance such as profitability through direct measurement. The profitability measure is then regressed on various measures of structure, such as industry concentration, barriers to entry and unionisation to explain the difference in market performance across industries (Carlton and Perloff, 2005). There were many SCP studies following the work of Bain (1951, 1956)³⁰ but as Schmalensee points out “Critics of this research strategy have noted serious limitations of available data” and “Accounting profitability is at best a noisy measure of profitability...” (Schmalensee, 1988, 648). Some researchers use the price-cost margin to measure performance in SCP studies to avoid the problems associated with calculating rates of return. However because marginal cost measures are rarely available many researchers use the price-average cost margin rather than

³⁰ Weiss (1974), Gilbert (1984) and Carlton and Perloff (2005) provide summaries of these studies.

the price-marginal cost margin, an approach that Carlton and Perloff (2005) suggest may lead to serious biases.

A further criticism of the earlier SCP studies is that many of these studies use explanatory variables which are not exogenous. This observation suggests that exogenous measures need to be found which explain differences in profitability in the short-stay accommodation industry in Tasmania when investigating the third of the research question in Chapter 1.

In the 1980s the focus of the empirical work shifted away from inter-industry studies to studies of firm level performance. Schmalensee notes that “While there are significant differences in industry-average profitability, there are often greater differences within industries” (Schmalensee, 1988, 649). In his paper Schmalensee uses analysis of variance (ANOVA) to decompose the variability in profitability data into an industry specific component, a firm specific component and a business unit specific component. The approach Schmalensee takes is essentially descriptive and he does not attempt to explain such variation. Many researchers have used this variance decomposition method to analyse intra and inter-industry variation in profitability. Most of these variance decomposition studies use pooled data from a large number of industries (J. Lipczynski, J. Wilson and J. Goddard, 2005).³¹ Although interesting, these decomposition studies are not primarily concerned with explaining variations in profitability within an industry so this is not an approach that is appropriate for investigating the third of the research questions in Chapter 1.

The shift in focus to the firm also resulted in a research stream known as the New Empirical Industrial Organization (NEIO). Researchers in this line of enquiry reject the more traditional measures of performance because of the difficulties posed by the use of accounting data, and estimate market power using models based on formal theories of profit-maximizing behaviour (Carlton and Perloff, 2005). They then use changes in exogenous variables (wages, taxes, demand growth) to explain variations in performance rather than endogenous variables such as concentration ratios (Carlton and Perloff, 2005). The NEIO researchers are therefore able to estimate market performance rather than measuring performance using an accounting proxy. In the NEIO researchers make observations of conduct in specific industries, and draw inferences about what these observed patterns of conduct mean for structure (Lipczynski et al. 2005). The direct approach in NIEO involves estimating marginal cost using cost data, for example (D. Genesove and W. Mullin 1998) or estimating price-cost margins, for example

³¹ Lipczynski et al. (2005) provide a summary of the profitability decomposition studies from 1985 to 2004.

(C. Hyde and D. Perloff 1998).³² The indirect approach uses changes in prices to infer changes in costs, for example (W. Roeger 1995). These studies are primarily concerned with inferences about market structure and not about profitability, so are not appropriate for investigating the third research question in Chapter 1. However they do provide guidance with analysing the Lerner index since they are concerned with measuring marginal cost and the price-cost margin and so are relevant to the first of the research questions in Chapter 1.

A final line of research in the shift in focus to the firm is the ‘persistence of profit’ approach in which researchers examine the time series behaviour of firm-level profit data (Lipczynski et al. 2005).³³ One of the earliest papers in this research line is that of J. Cubbin and P. Geroski (1987) which “...uses a newly constructed panel data set on large UK firms to study the relative importance of firm-specific and industry-specific determinants of profitability over time” (Bresnahan and Schmalensee 1987: 375). Cubbin and Geroski (1987) use accounting data from company accounts to generate a measure of profitability and find

[t]he systematic persistence of profitability that we do observe arises primarily from persistence in the firm specific component of above average profits rather than the industry specific component (1987, 440)

They also found

[f]airly clear reasons to believe that market dynamics within industries are likely to be rather heterogeneous, with differences between firms often persisting for long periods of time (1987:440)

These findings suggest that it may be possible to find evidence of variations in profitability between firms in the short-stay accommodation industry in both the short run and the long run. As Lipczynski et al. note, “if some firms possess and are able to retain specialized knowledge or other advantages, these firms may be able to earn profits that remain above the norm persistently, in the long run”(Lipczynski et al. 2005,345). Bain (1951;1956) makes the point that incumbents may have patented product innovations, have cornered the right niches in the product space or may enjoy consumer loyalty which may prevent supranormal profits from being eroded by entry.

Although the industrial organization literature is helpful in investigating the research questions in Chapter 1, another approach to investigating performance is found in the industrial relations literature which is also relevant. This is the research by S. Machin and M.

³² Carlton and Perloff (2005) provide a summary of the price-cost margin studies from 1981 to 1998.

³³ Lipczynski et al (2005) provide a summary of the persistence of profits studies from 1988 to 2004

Stewart (1990, 1996) into the “...the ability of trade unions to affect profit levels in certain situations by extracting a share of any rents” (Machin and Stewart, 1996, 327). Of interest to the research questions in Chapter 1 is the approach that Machin and Stewart take to the measurement of performance of firms. The measure of financial performance used by Machin and Stewart (1990, 1996) is qualitative and based on survey questioning of managers.³⁴

(Machin and Stewart 1990) make the point that

Despite the reduced information provided by a categorical variable such as this relative to a continuous profit measure, and the subjective nature of the question, it still possesses useful information pertinent to an empirical analysis of the determinants of financial performance (1990, 330)

Machin and Stewart note the problems associated with accounting measures of performance or data constraints in using price-cost margins. They also note that qualitative information

[h]as advantages as well as disadvantages but does provide a useful counterpoint to the more conventional measures. In particular it reflects what managers actually consider to be financial performance and, even if this is a mixture of various indicators like accounting profits, productivity, and cash flow this is of considerable interest in itself (1990, 330)

It is evident that the qualitative measure of performance used by Machin and Stewart (1990) can be adapted for use in the investigation of the third of the research questions in Chapter 1 thereby avoiding many of the problems encountered in the SCP or NEIO research with measuring profitability using accounting data. Firms can be asked about relative or absolute levels of financial performance or profitability using a qualitative question in a survey.

A final point in this discussion involves two recent studies of profitability by S. Feeny and M. Rogers (1998) and M. Rogers (1999) in which the authors consider actual levels of profitability in large Australian firms over the period 1985 - 1996. The papers provide the only recent information on the profitability in the accommodation industry in Australia so are helpful to the investigation of profitability in the short-stay accommodation industry in this thesis. Feeny and Rogers (1998) and Rogers (1999) use return on assets, return on equity and the earnings before depreciation interest and tax (EBDT) margin as measures of performance. The main conclusion of their papers is that each profit measure can lead to a different conclusion concerning firm performance, even though the three measures are positively correlated with each other. They found that the accommodation industry was a persistently

³⁴ The data are drawn from a question in the Workplace Industrial Relations Survey, 1980 and 1984. The question is “How would you assess the financial performance of this establishment, compared with other establishments and firms in the same industry?” The response choice is “(i) Better than average, (ii) About average and (iii) Below average”.

low performer in their sample of Australian companies over the period 1985 to 1996. Ville and Merrett (2006) construct a long time series for business profits for Australia for the period 1947 to 1986 and find an average return on equity for the period of around 8%. These three studies on levels of profitability in Australia provide background information for the investigation of the third of the research questions in Chapter 1 as they give some indication of the possible average return on equity for firms in the short-stay accommodation industry in Tasmania. They therefore provide a benchmark for studying returns in the Tasmanian industry after allowing for any change in conditions from 1996 and any variation in returns. The studies also give some indication of the measures of profitability that can be used in the investigation of the third of the research questions.

In summary there are a number of conclusions that can be drawn from this survey of profitability studies. The first conclusion is that many researchers have considerable difficulty in measuring profitability or price-cost margins from accounting data, as is the case with the SCP studies. The second conclusion is that the alternative approach of the NEIO, whilst helpful for investigating market power in industries, is not appropriate for the investigation of the research questions in Chapter 1. The third is that the approach taken by researchers in the industrial relations field using survey data is an approach that can be used in the investigation of the third of the research questions in Chapter 1. The last of the conclusions is that empirical work on profitability levels in Australia suggests differences in profitability according to how profitability is measured and that accommodation has had relatively low return levels compared to other industries in Australia.

The final stage in this survey of the literature is to explore the studies where researchers investigate firms directly by asking questions and using the survey method. Schmalensee (1988) makes the point in his discussion of approaches to empirical research in industrial economics that interview and survey methods can provide information not otherwise available. It is therefore useful to see how researchers have used these methods in the context of the investigation of the research questions in the short-stay accommodation industry.

3.3 Survey use in economic investigations

The studies by Machin and Stewart (1990; 1996) provide a useful link between the previous section on profitability and this section on the use of surveys in economic investigations. The data used by Machin and Stewart (1990; 1996) came from the Workplace Industrial Relations

Survey.³⁵ Using surveys to collect data for economic analysis has a long history with one of the earliest studies being that of Oxford Economists Research Group (OERG). R. Hall and C. Hitch (1939) documented this investigation, which involved interviewing 38 entrepreneurs and asking questions about their pricing policies and investment decisions. Hall and Hitch note that they “...are acutely conscious of the shortcomings of an inquiry of this kind” (1939, 12) but found that “...on some questions the replies are so nearly unanimous that it is impossible to ignore their implications” (1939, 13). The findings of the OERG provoked considerable discussion amongst economists although A. Blinder, E. Canetti, D. Lebow and J. Rudd comment that “it appears that this was both the first and last interview study of pricing to have a major impact on the thinking of economists” (1998:40). The dominant view in economics has been that the behaviour of individuals, such as firms, should be observed and their preferences thereby revealed. The investigation in this thesis proposes the use of the survey method so it is helpful to consider how more recent researchers have justified the use of the survey method given the dominant view.

A number of studies using interviews and questionnaires appear in the literature from the time of the Hall and Hitch (1939) paper to the end of the 1980s but it is the recent studies by G. Reid (1993), Blinder et al. (1998) and T. Bewley (1999) that provide the more useful background for the investigation of the research questions in Chapter 1. Reid (1993) reports on a survey of small, newly formed, owner-managed enterprises in Scotland carried out during the 1980s which combines qualitative data from interviews and quantitative data from an administered questionnaire. Blinder et al. (1998) use a structured questionnaire in a survey in the 1990s of 200 companies in the private, unregulated, nonfarm, for-profit component of GDP to investigate theories of price stickiness. Bewley (1999) is a prominent example of the use of unstructured interviews (of more than 300 business people, labour leaders, counsellors of the unemployed and business consultants in the Northeast of the United States) in an investigation of the issues causing wage rigidity.

Reid, Blinder et al. and Bewley all discuss the decision they made to investigate the questions they were interested in by asking firms directly. Reid (1993) notes that

An important feature of field work is that it enables the empirical investigation to be well grounded in reality, in a way that using official secondary source statistics does not (1993, 8)

³⁵ The Workplace Industrial Relations Survey (WERS) series began in 1980. The primary aim of the survey series is to provide statistically reliable, nationally representative data on the current state of workplace relations and employment practices in Britain.

Blinder et al. (1998) note that “economists are disposed to be skeptical that you can learn anything from economic behavior by asking people” (1998, 10). They also comment that

Thus while many objections to the interview method have some validity, we should keep them in perspective. Economists should evaluate the usefulness of any suggested mode of inquiry—including interviews – by posing the classic question: Relative to what? (1998, 11)

Bewley (1999) makes the point that

Even if no controls were available it would be presumptuous to ignore the testimony of people who make economic decisions and observe and participate in economic life (1999, 14)

These rationales about the decision to collect data directly from firms and the discussion of the price discrimination and profitability literature provide the basis for the decision to use a survey to investigate the research questions in Chapter 1. As noted in sections 3.1 and 3.2 in many cases the data required to test questions about pricing and profitability are either not available in official statistics or are very difficult to observe. Using a survey allows price discrimination and profitability to be investigated for an industry in comparison to the narrower studies of McManus (2007) Leslie (2004) which were focussed on firms or relatively small groups of firms within an industry.

3.4 Issues associated with the use of surveys

To finish this chapter a number of the issues associated with the use of surveys, which Reid (1993), Blinder et al. (1998) and Bewley (1999) highlight, are also discussed. These issues concern the choice of sampling method and the use of a pilot survey.

Sample design involves selecting the part of the population to be included in the survey. The distinction is made between whether the data are selected, or not, by a probability mechanism. If a probability mechanism³⁶ is used then each element has a known, non-zero chance of being included in the sample and the data can be used for statistical inference. As Reid (1993, 8) notes “Typically, one is unable to explore all sites, so sampling is involved”. He selected a sample that depended on field contacts and so was not of a calculated probabilistic form. However he notes “...I have no evidence of systematic bias over crucial dimensions” and “I feel it is appropriate... to use statistical techniques like regression analysis which treat the sample as a random drawing from a population of small firms” (Reid,

³⁶ Examples include random sample, systematic sample, stratified sample and cluster sample.

14). Blinder et al. (1998) generated a random sample of firms but then “...compared the resulting distribution with the distribution of GDP by industry” (1998, 64) and “When we verified that the two distributions matched closely, we were confident that our procedure was correct” (1998, 64). Blinder et al. make the point that although they did generate a random sample there was always the possibility of non-response bias if the 61% of the sample that agreed to be interviewed differed systematically from the 39% that refused. They checked the distributions of characteristics in their respondents and believed they had a reasonably representative sample of the relevant portion of GDP. Finally Bewley (1999) did not generate a random sample as he wanted a sample that was as varied as possible and he recognized that there was a trade-off between sample randomness and interview quality. He wanted to see patterns in the relation between what people said and the circumstances they face. He believed that using personal connections and some cold calling of firms to generate a varied sample would enable him to see these patterns.³⁷

The discussion of the sampling method in the surveys of Reid (1993), Blinder et al. (1998) and Bewley (1999) suggest that using a survey to collect data to investigate the research questions in Chapter 1 should seek to achieve randomness so that the data can be used for statistical inference. However a random sample may not be appropriate for a pilot study. The purpose of a pilot study is to allow the survey instrument to be tested and to allow an estimate to be made of the likely response rate. Reid (1993, 10) ran a pilot study of 13 firms and commented that “...it was felt that fairly precise prior instrumentation was appropriate, provided the instruments were carefully tested in pilot work”. Blinder et al. (1998) ran a pilot study and found that

We learned a great deal from the pilot study. It led to some changes in questionnaire and ... helped us considerably in developing procedures for contacting people and conducting interviews. When you are travelling in uncharted territory, there is nothing quite like a little reconnaissance mission (1998, 60)

Bewley (2002) eschewed the pilot study approach and arranged a few interviews with business people anticipating making no more than 15 interviews. He then found himself drawn into doing more and persisted until he felt had learned as much as he could. This is an ethnographic approach and contrasts with the structured approach taken by Blinder et al. (1998). Reid (1993) incorporated qualitative unstructured fieldwork into the first stage of his

³⁷ Cold calling is the process of approaching prospective respondents who were not expecting such an interaction.

study where one of his co-workers became a participant observer in a firm for three months. This unstructured fieldwork led to the development of the administered questionnaire used by Reid for his survey.

The observation from this discussion of the methodology issues is that any sampling method should consider the purpose of that sampling. If the sampling is being carried out for the purposes of a pilot study then a random sample may not be appropriate. However random sampling is appropriate when collecting data in a survey for statistical inference.

3.5 Conclusions

The discussion in this chapter focuses on the previous literature relevant to the research questions in Chapter 1. This literature first covers empirical studies on price discrimination and profitability. The conclusion from this discussion is that because of the limitations in measuring marginal cost and profitability different ways have had to be found by researchers to investigate price discrimination and profitability. An alternative approach to empirical investigations in economics is to collect primary data. A number of recent studies which use this approach are discussed in the chapter. It is appropriate, given the present discussion on the measurement of key variables and the discussion of the extant data in the previous chapter, that a survey of firms in the short-stay accommodation industry be used to generate primary data to investigate the research questions in Chapter 1. The development of this survey and collection of the primary data is described in the next chapter.

4 Survey design and administration

This chapter describes the process of designing and administering the survey used to collect the data set for the analysis of the research questions identified in Chapter 1. In order to understand the pricing strategies and profitability of firms in the short-stay accommodation industry data on prices, sales, costs, elasticity of demand and profitability are required. The discussion in Chapters 2 and 3 established that the extant data for this industry was insufficient to investigate pricing decisions and to answer the specific research questions. The decision was therefore made by the researcher to obtain information directly from firms.

The selection of the population for the survey is described in Section 4.1 and the fieldwork plan in Section 4.2. The fieldwork plan involved three stages. In Section 4.3 the first stage of the fieldwork is described. In this stage a series of semi-structured interviews were conducted with industry representatives resulting in the development of the pilot questionnaire. The second stage of the field work was the administration of the pilot survey and this is described in Section 4.4. In Section 4.5 the third stage of the fieldwork is described, which was the administration of the survey. Section 4.6 concludes the chapter. A number of interesting observations and findings relevant to the research questions came out of the process of developing the questionnaire and administering the pilot survey. These are reported in this chapter as they appear in the process.

4.1 Selecting the target population

The first step in the process of collecting the data was to define the target population. G. Kalton notes that

It is a useful exercise to start by defining the population as the ideal one required to meet the survey objectives – the *target population*. This definition is then often modified to the *survey population* to take account of practical constraints (1983, 6). ...The advantage of starting with the ideal target population is that the exclusions are explicitly identified, thus enabling the magnitude and consequences of the restrictions to be assessed (1983, 7).

The target population is all those short-stay accommodation firms in Tasmanian with five or more rooms. The ABS data series³⁸ described in Chapter 2 provides the reference point for defining the target population as this series includes all those short-stay accommodation firms with five or more rooms which are licensed hotels, motels and some of the guest houses and

³⁸ ABS Tourist Accommodation, Small Area Data, Tasmania, Quarterly Series 8635.6.55.001.

serviced apartments. However, the ABS data series does not include any of the bed and breakfast and cottage firms. The ABS data series population of 291 firms is contained within the target population list of 425 firms obtained from Tourism Tasmania and which includes bed and breakfast, cottage and the remaining guest houses and serviced apartments.³⁹ Individual firms could not be matched across the ABS series and the Tourism Tasmania list as the ABS does not allow identification of individual firms

Those firms with four or less rooms were not included in the target population on the following grounds

- i. Selecting the same room size cut off for the target population means that the distribution of firm characteristics in the ABS data series population, as described in Table 2.1, could be compared to the distribution of firm characteristics in the target population to check for consistencies across the two populations. This consistency is important in the current study because the ABS achieves a very high response rate and so is very close to describing the ABS data series population. Checking that the target population is consistent with the ABS population ensures the target population provides a non-biased starting point for the survey. Additionally, price and quantity data collected from firms in the target population can be used to generate revenue and occupancy data and compared with the revenue and occupancy data in the ABS data series to check for consistency across the two data sets ensuring the sample of respondents is not biased.
- ii. Assuming an average occupancy rate of 80%, average room rate of \$200 and average net yield of 15% a firm with 5 rooms could generate profit of \$840 per week.⁴⁰ With four rooms the profit per week falls to \$672. Given that average weekly earnings per person in June 2005 in Tasmania were \$718.7, a firm with four or less rooms generated a weekly profit below the average weekly earnings per person in June 2005.⁴¹ Based on discussions with Tourism Tasmania in June 2005 it is argued that firms with fewer than five rooms would be likely to supplement the profit generated by the short-stay accommodation firm with income from other sources. It is argued that this kind of cross subsidy is less likely with firms who have five or more rooms. The purpose of the research is to investigate profitability and pricing strategies in the

³⁹ The target population was identified using information provided by Tourism Tasmania, extracted from the TigerTOUR database in June 2005.

⁴⁰ Based on figures provided by Tourism Tasmania in June 2005.

⁴¹ ABS Average Weekly Earnings, Tasmania, Quarterly Series, 6302.0, June 2005 quarter.

short-stay accommodation industry, so profit should be generated within the industry, and not include a subsidy from income earned elsewhere.

The next step suggested by Kalton (1983) in the survey design is to decide whether the population needs to be refined in some way. Given the size of the target population and the fact that it was feasible to contact the 425 firms either by mail or email the population was not further refined – the target population and the population are the same. A database of firm characteristics information for the 425 firms was compiled by the researcher and called Short-Stay Accommodation Business Data (SABD). Table 4.1 describes the distribution of firm characteristics of the SABD population. These characteristics are firm type, location, size and star rating.⁴² It is not possible to statistically test whether the distributions in Table 4.1 are significantly different from those already reported in Table 2.1 for the ABS data series because there are differences in the make-up of the two populations. SABD contains an additional 134 bed and breakfast, cottage, guest house and self contained firms. However the data in the Table 2.1 and Table 4.1 can be compared.

Table 4.1 shows that 55% of the firms in SABD had fewer than 15 rooms compared to 47% in the ABS data series population and 33% of firms in SABD had a star rating of 4 and above compared to 40% in the ABS data series population. These differences reflect the inclusion of the bed and breakfast and guest house firms in SABD. Further analysis of the population in SABD by the researcher indicated that the mean number of rooms in a bed and breakfast or cottage firm in SABD was 8 whereas the mean number of rooms in a hotel or motel in SABD was 30.

⁴² The 2.5 star and 2 star categories and the 4.5 and 4 star categories were each combined to avoid possible identification of businesses. The region boundaries for the ABS data series are shown in Appendix 1 and for the SABD population in Appendix 2.

Table 4.1 Distribution of characteristics of firms in SABD

	Number	Percentage
Type		
Bed and breakfast	79	19
Cottage and guest house	25	6
Hotel and motel	224	53
Self contained	97	23
Total	425	
Region		
Derwent Valley and Central Highlands	22	5
Heritage Highway	21	5
Tasman Peninsula and the South East	17	4
Huon Dentrecasteaux Bruny	12	3
St Helens and the Northeast	30	7
Hobart and Surrounds	92	22
Launceston and Tamar Valley	69	16
Freycinet and the East Coast and Flinders Island	39	9
Devonport, Cradle Mountain, Gt Western Tiers	52	12
Stanley and the North West and King Island	37	9
Strahan and the West Coast	34	8
Total	425	
Number of rooms		
50 rooms or more	48	11
40 to 49 rooms	21	5
30 to 39 rooms	31	7
20 to 29 rooms	56	13
15 to 19 rooms	39	9
10 to 14 rooms	62	15
5 to 9 rooms	168	40
Total	425	
Star rating		
2.5 star and below	16	4
3 star	49	11
3.5 star	105	25
4 star	100	23
4.5 star and above	45	10
unrated	111	26
Total	425	

Sources: TigerTOUR database, Tourism Tasmania June 2005

It was possible that some of the firms in the SABD population had customers who were staying for longer periods in June 2005. The research questions in this thesis are concerned with the short-stay accommodation industry and including long-stays would generate bias in the results since long-stays can attract significant discounts on rental rates. Data from the Tasmanian Visitors Survey indicated the average length of stay of visitors to Tasmania was 9 nights for the 12 months ending June 2005 indicating that some customers stayed longer than 9 nights in one accommodation property. It was not possible to separate out those firms with long-stay customers although feedback from Tourism Tasmania⁴³ indicated that the numbers were small so any bias in the results should be relatively minor.

The next step in the study was to determine the fieldwork plan for collection of the data from the population of firms. This step is described in the following section.

4.2 Fieldwork plan for the collection of data

The method followed for the collection of the data was suggested by the study of Reid (1993). The population of small firms that Reid studied was similar in size and characteristics to the short-stay accommodation industry population in SABD. It was believed by the researcher that following this fieldwork plan would ensure a good response rate and data that could effectively be used to test the research questions. The three stages of the fieldwork were:

Stage 1 Development of the pilot questionnaire between June 2005 and September 2006;

Stage 2 Administering the pilot survey between October 2006 and September 2007; and

Stage 3 Administering the survey between June 2008 and September 2008.

Stage 1 of the fieldwork involved using a semi-structured approach to ask firms and industry representatives about decision making with regard to pricing and profitability.⁴⁴ The approach was semi-structured as a draft questionnaire was developed and discussed in a series of interviews with firms and industry representatives. Stages 2 and 3 involved a structured

⁴³ Based on discussions with Tourism Tasmania in June 2005.

⁴⁴ This approach was similar to the one taken by Reid (1993) in Stage 1 of his study and also to that of Bewley (2002) in his study.

approach with the pilot questionnaire being developed and tested in Stage 2 and the revised questionnaire then being used for the survey in Stage 3.⁴⁵

4.3 Stage 1: Developing the pilot questionnaire

The purpose of Stage 1 was the development of the questionnaire for use in the pilot survey in Stage 2. A draft questionnaire was first developed by the researcher based on the research questions in Chapter 1. The questions were guided by the questionnaires developed by Blinder et al. (1998) and Reid (1993) and also in the WIRS study used by Machin and Stewart (1990). Developing the questionnaire was an iterative process similar to that followed by Blinder (1998) and Reid (1993) where small changes in the draft questionnaire made over the fifteen month period of Stage 1 reflected a re-evaluation of the critical points in the research questions. The critical points relate to the issues raised in Chapter 3 about the measurement of elasticity of demand, marginal cost and profitability. The critical points also relate to the extent to which the firms use direct or indirect price discrimination strategies and whether or not they could report on such strategies.

The first step in the development of the draft questionnaire was a series of discussions about the broad theme of the research and the specific research questions with three industry representatives.⁴⁶ These discussions were designed to introduce the work at hand to the industry representatives and to establish that the broad theme and specific research questions accurately reflected the key areas associated with the decision making of firms in the short-stay accommodation firms in Tasmania. The discussion with the industry representatives confirmed that the work would be of interest to the firms, thereby encouraging participation. Feedback from the industry representatives also confirmed that the short-stay accommodation operators would be able to answer open ended questions and questions involving a Likert scale.

The next step was to test the draft questionnaire in a series of semi-structured interviews with firms and industry representatives.⁴⁷ The interviews were semi-structured since this format allowed discussion and comments of a qualitative nature on the draft questionnaire. The objective of the discussions was to understand firm behaviour with respect to the research

⁴⁵ The approach taken in Stages 2 and 3 was similar to that taken by Reid (1993) in the later stages of his study and by that of Blinder et al (1998) in their study.

⁴⁶ The industry representatives are listed in Appendix 3.

⁴⁷ The industry representatives and firms are listed in Appendix 3.

questions and in the process to obtain feedback on the style and content of the questions in the draft questionnaire. The firms and industry representatives did not complete the draft questionnaire but provided input to the design of the questions and gave some indication about whether or not the firms would be able to answer the questions. The selection of these firms was not random since the intention was to find operators and representatives who had a good understanding of the way the industry operated.⁴⁸ It was believed that selecting firms who understood the industry would lead to a questionnaire that was well designed and that could be used effectively.

In the interviews the nature and purpose of the research was first described, the methodology explained and the questionnaire then discussed. The key points from the interviews are summarised below.

- i. Firms are required to submit information to the Australian Tax Office (ATO) and the ABS which would assist the operators in completing the questionnaire for the thesis. Operators keep records to complete the questionnaire for the Tourist Accommodation, Small Area Data, Tasmania, Quarterly Series 8635.6.55.001 and were likely to be able to provide more disaggregated information on sales (quantities) and prices.⁴⁹ Operators who have a turnover greater than \$50,000 are required to complete a Business Activity Statement for the ATO and, if they are registered as a business they are required to complete accounts and submit an annual tax return. These processes all require financial information indicating that measures such as return on assets, return on equity, and data on costs should be accessible to firms.
- ii. Relative measures of return on assets and return on equity would be hard for the operators to estimate as this is information that firms working in the competitive short-stay accommodation would be anxious not to reveal to each other. Absolute measures of these variables should therefore be used in the design of the questionnaire. Firms should also be asked about return on assets and equity before interest and tax are deducted to make it easier for the respondents to complete.
- iii. Measures such as return on assets or return on equity may not capture the total benefit that firms gain from their business. Those operators who own their own firm may have been making a lifestyle choice when choosing to operate a short-stay

⁴⁸ The researcher attended a TCT/iTOT Tourism Conference on 'Brand and You' in August 2005 and established contacts with the firms who were key figures in the industry at this event.

⁴⁹ The interviewees indicated that the aggregated information required for completion of the ABS questionnaire is compiled from disaggregated data collected by firms.

accommodation business. The returns for these owner operators may be low relative to other firms in the industry but their personal satisfaction could be relatively high. The decision by firms to enter or exit the short-stay accommodation industry will therefore involve behavioural variables. To account for such variables the owner operators should be asked about financial performance and lifestyle satisfaction and all operators (including the non-owner operators) should be given the opportunity to answer open ended questions on how they measure the success of their firm.

- iv. Firms systematically segment their market for direct price discrimination purposes by identifying customers according to whether they are corporate or leisure customers, whether they are returning or first-visit customers, and how they make their booking. However it is judged less likely that firms would be able to answer questions about indirect price discrimination strategies such as quantity discounting. The firms are likely to have information about the percentages of customers who purchase more than one night from previous sales data. Firms may also know about the price sensitivity of the groups of customers who select more than one night and can offer prices to match this sensitivity. They offer prices for self-selection because they have no way of identifying individual customers *a priori* who intend to purchase more than one night. However the interviews reveal that it is likely that a substantial fraction of the firms will not be able to explain their motivation for offering quantity discounts, particularly in terms of generating maximum profit from high demand customers.
- v. Firms may offer customised prices with deals on prices negotiated at an individual level either by telephone or in person at the door. Time of year also influences the decision to offer discounts with the firms more likely to offer discounts in off-peak periods. Pricing decisions also have to take account of cultural differences where customers have traditions of haggling and negotiation and of exchange rate changes where customers are from overseas. Factors such as fairness and reputation are also important issues in pricing decisions and should be incorporated into the questionnaire.
- vi. Firms commonly monitor the average net rate or yield they receive for their room sales. Monitoring average net rate or yield means firms can observe the balance between sales through, for example, a wholesaler which attract 25% commission, sales through Wotif.com which attract 10% commission, and direct sales, which attract no commission. This balancing of sales through different distribution channels is interesting information as it suggests that the firms use the distribution channel

information on sales and prices in a systematic way. An observation that also came out of the discussion of yield is that it is important to clarify in the questionnaire whether it is the discount from the indicative price (rack rate) or the rate of commission, or both, that are being investigated to avoid confusion in the firms' responses.

- vii. Price sensitivity is difficult for firms to assess when there are increases in demand and increases in the number of rooms available. This is an interesting observation in terms of the empirical estimation of elasticity in economics since the observation concurs with the identification problems which can occur in estimating demand elasticities. Firms are aware of the difficulty in assessing customer sensitivity when there are demand and supply side changes. Firms in the short-stay accommodation industry are likely to have a 'good feel' for the price sensitivity of their customers based on previous price increases in the period 2000 to 2003 when visitor numbers were steady and there was no change in inventory.
- viii. Rather than asking about percentage changes in demand following a 10% change in price an easier way to ask about price sensitivity for firms would be to ask about changes in revenue following a 10% increase in price. This is because firms keep revenue (accommodation takings) data for the ABS data series⁵⁰ and so could easily assess changes in revenue after a price change.
- ix. It needs to be clear whether the change in price is an industry wide change or simply a change by that firm. Firms understand the difference between the two but the lack of any systematic industry wide changes in prices over the period 2000 to 2005 would mean that they would be judging the revenue changes simply in terms of a firm's change in price. The questions about price sensitivity needed to be worded in such a way as to make this clear.
- x. Firms are likely to understand the distinction between fixed and variable costs and be able to provide costs per room night across different market-group categories but might find it much more difficult to provide the average cost per room night. Calculating average costs presented difficulties in deciding how to distribute fixed costs. It was therefore important that the cost questions not be too complicated to complete. The data would be unreliable without clear specification about what should be included and what should be left out in cost calculations. It should be made clear

⁵⁰ ABS Tourist Accommodation, Small Area Data, Tasmania, Quarterly Series 8635.6.55.001.

that the costs are those costs in addition to commission. Cost per room night might be easier to provide than costs per guest night but the cost questions in general would probably be the most difficult for the firms to complete so some guidance with questions on costs would be helpful.

- xi. Asking about competitiveness in terms of different room types is not appropriate since firms appear much more likely to define themselves as providing a particular overall quality of accommodation relative to similar firms in the industry rather than being concerned with qualities across rooms between firms. Firms benchmark themselves against other firms of the same quality in a variety of ways but the only systematic process in the industry was the AAA star rating system. Any question on competitiveness should consider a firm in relation to other firms of similar type and pricing position irrespective of where they are in the State. Many customers travel around Tasmania and stay in accommodation in a similar price and quality range so competitive conditions for a firm needs to consider 'like' firms.
- xii. Collecting data for a month or quarter could be time consuming for the respondents and may discourage completion so firms should be asked to consider a typical week in the winter and summer. Asking about a typical week in the winter and summer also means that variation across the years in terms of peak and off peak pricing can be captured.
- xiii. Questions should have background notes attached to them to help respondents complete the questions. These should be included after each question in the questionnaire. The questionnaire should be an on-line questionnaire for all those operators with an email and should be a postal questionnaire for those without an email address.

The summary of the interview responses guided the development of the questionnaire for the pilot survey. The questionnaire was developed in an iterative manner throughout the first stage period. The next step was to test the questionnaire in a pilot survey. Stage 2 of the fieldwork plan involved administering the pilot survey.

4.4 Stage 2: Administering the pilot survey

The pilot survey served a number of purposes. It was used to test the questionnaire, to assess whether there was sufficient variation in the data for analysis, to minimise non-response and

measurement errors and to estimate the response rate of the survey.⁵¹ Non-response error refers to error (or bias) introduced when those who do not respond differ in the characteristic of interest from those who do respond. Measurement error refers to the error (or bias) introduced when inaccurate recording of data occurs through misinterpretation of questions by respondents.

4.4.1 Deciding on a sampling method for the pilot survey

The selection of the sample for the pilot survey followed the sampling method of Reid (1993) and Bewley (2002). The sample needed to provide a view of the likely responses of the population of firms and it was believed that this could best be achieved by focusing on field contacts with a good understanding of the industry. At this stage there was little to be gained from a probability sample with the pilot survey, although the sample needed, as far as possible, to reflect the characteristics of the firms in the population.

A sample of 41 firms was selected from the population for the pilot survey, which represented about 10% of the population. It was anticipated the pilot survey would generate a response rate of about 25%.⁵² The sample size and expected response rate was consistent with the pilot surveys of Reid (1993) and Blinder et al. (1998). To assure a response rate of at least 20% firms for the pilot survey were approached using contacts from the industry representatives. These contacts were individuals who were involved in industry organisations and were interested in ensuring the survey was effective. The contacts were approached in September 2006 and 48 firm names were provided by these contacts.⁵³ The researcher also had 2 personal contacts, which were added to the list. The 41 firms were selected from this list of 50 contacts with the composition of these firms reflecting the distribution of characteristics in Table 4.1. Nine of the contact names were not used as the firm characteristics duplicated those of firms already selected.

The pilot questionnaire was loaded onto an online survey software platform called QuestionPro enabling ease of completion of the questionnaire by firms. The software also made revision of the pilot questionnaire and analysis of the data from the questionnaire easier to manage than a hard copy questionnaire. It should be noted that 80% of the firms in the

⁵¹ The questionnaire used in the survey is in Appendix 4.

⁵² Based on informal feedback from Tourism Tasmania on response rates for the short-stay accommodation industry.

⁵³ The industry representatives who provided contacts are listed in Appendix 3.

population had an email address and internet access at the time of the pilot survey.⁵⁴ The pilot survey was conducted over the months of October 2006, June 2007 and September 2007. These periods were selected because they avoided the busy period of the short-stay accommodation year. By running the pilot survey over three periods the questionnaire content and administration process could be modified in an iterative manner resulting in a final version of the pilot questionnaire by September 2007. Sections 4.4.2 and 4.4.3 describe the process of administering the pilot survey and the key issues that arose in this process.

4.4.2 Administering the pilot survey during the October 2006 and June 2007 phases

A hard copy of the letter of invitation was sent to 28 of the 41 firms in October 2006 and June 2007 inviting them to participate in the pilot survey.⁵⁵ Although these firms all had an email address it was decided by the researcher that the initial contact should be by mail.⁵⁶ The firms were selected so that they represented the population in terms of type, location, size and star rating of firm. The letter was followed up by an email a week later inviting the firms to participate in the pilot survey.⁵⁷ Those who agreed to participate were then sent the online link to the questionnaire and a consent form was sent in the post. The questionnaire software enabled the researcher to check progress on the questionnaire so the researcher could note whether the invitees had viewed the questionnaire or partially completed the questionnaire. Once the questionnaires were completed the researcher sent the participants a hard copy of their own responses. Six firms completed the questionnaire during the October 2006 and June 2007 phase of the pilot survey.

The key issues arising from this stage of the pilot survey are summarised below. The first issue relates to the content of the questionnaire, the remaining issues to the administration of the questionnaire.

1. In terms of the content of the questionnaire the responses confirmed that it could be used to collect data to test direct (third degree) price discrimination using the distribution channels, corporate, leisure, return-visit and first-visit market segments as identifiable market groups. Firms however found it difficult to provide data on sales and prices for customers purchasing multiple nights. This is

⁵⁴ Information provided by Tourism Tasmania, June 2006.

⁵⁵ 16 firms were approached in November 2006 and 12 in June 2007

⁵⁶ The decision was based on advice from the industry organisation contacts who recommended that for good response rates the initial contact be made by letter with follow up contact by email.

⁵⁷ The pilot survey letter is attached at Appendix 5.

an interesting finding, also identified in the semi-structured interviews, because it suggests that firms will first use the information that is least costly to obtain to price discriminate. That is the information on the distribution channel the customer uses and whether they are a corporate, leisure, return-visit or first-visit customer. It appeared that although quantity discounts were being offered at the time of the survey a substantial fraction of firms could not articulate how they arrived at the quantity discount offering. Survey questions on willingness to pay for multiple nights and sales of multiple nights might therefore suffer from low response rates and were not included in the survey questionnaire.

2. The first administrative issue concerned the questions on return on assets and return on equity. These questions require confidential information which has considerable competitive value. It became clear when running the pilot survey that participants would have to be reassured that their data would remain confidential.⁵⁸. A further issue with the return on assets and return on equity data is that the respondent may not have access to such confidential information if, for example, they are an employee rather than an owner operator. The questionnaire therefore needed to contain a question which asks about the position of the person completing the questionnaire and whether or not they were the owner operator.
3. The second administrative issue related to the software subscription from QuestionPro that was used for the pilot survey. This version of the software did not allow for either the researcher or the participant to save an electronic copy of the completed questionnaire, although an upgrade to the business version subscription did. The business subscription also allowed the participant to save a partially completed questionnaire electronically and go back to it at a later date or time. It became clear during these waves of the pilot survey that this facility was required if the survey was going to generate a good response rate. The firms often had to be available to deal with customers throughout the entire period of their stay. Hence the operators often had few uninterrupted periods of time to complete a questionnaire. Being able to use the save facility meant the firms were more likely to participate as it allowed flexibility in completion.
4. The third administrative issue that emerged during the waves of the pilot survey related to the timing and process of inviting firms to participate. A number of

⁵⁸ The requirements contained in the approval obtained from the University of Tasmania Ethics Committee can be used to provide this reassurance.

firms responded positively to the email sent after the initial letter of invitation, indicating that they would be interested in participating. However when the questionnaire link was sent to these invitees they declined to participate without viewing the questionnaire. The initial positive response may have been a courtesy email from the firm but may also have indicated some willingness to be involved. It was decided that the email sent after the letter of invitation should contain the electronic link to the questionnaire. This process meant that all invitees would have access to the link and not just those who had indicated an interest in participating. By changing the process in this way the invitee had less chance to drop out and could view the questionnaire immediately in the email following the letter of invitation.

5. The final administrative issue concerned the completion of the consent form. Initially a hard copy of the consent form had been sent to the firm once they had agreed to participate. It was judged appropriate to process the consent form in this way but the second mail out generated delays that, it was believed, discouraged participation. It was decided that the letter of consent would be included in the online questionnaire and the hard copy of the questionnaire ensuring that all invitees received it and no follow up mail out was required ensuring less delay for respondents.

Following revision of the pilot survey questionnaire based on the first two waves of the pilot survey, the questionnaire was presented at a School of Economics and Finance seminar in June 2007. The questionnaire was also discussed in an ABS survey design course which the researcher attended in June 2007.⁵⁹ The researcher received constructive feedback on both the questionnaire and the preliminary analysis of the pilot survey data. Some of the questions in the questionnaire were simplified following this feedback and the format of the questionnaire re-arranged to make the questionnaire easier to complete. The questionnaire was divided into sections with headings and the branch facility in the questionnaire software was also incorporated into the questionnaire. This facility meant that respondents could answer 'yes' or 'no' to questions and, if answering 'yes', the respondent would go to an open ended question. If answering 'no', the respondent would move to the next branch of the question ordering logic. This procedure enabled a respondent to move more quickly through the questionnaire which, it was believed, would encourage completion.

⁵⁹ Australian Bureau of Statistics, Survey Design Course, 19-20 June 2007, Hobart.

4.4.3 Administering the pilot survey during the September 2007 phase

A final wave of letters of invitation and consent forms was sent to the remaining 13 firms in the pilot survey sample during September 2007 and 5 firms completed the questionnaire. The final wave of the pilot survey demonstrated that the process of inviting participation and the questionnaire itself had been effectively revised. The firms who completed the questionnaire were able to do this without any complication. The response rate for the pilot survey overall was 27% with 11 firms participating from the 41 sent invitations to participate.

4.4.4 Post-pilot survey discussions with industry representatives

One further consultation was carried out with industry representatives as a final check on the questions and responses to those questions from the pilot survey. The questionnaire was discussed with industry representatives during the period November 2007 to June 2008.⁶⁰ Minor modifications were made to the questionnaire incorporating comments and suggestions from these industry representatives on the help notes.⁶¹ The help notes were updated on the online version of the questionnaire and a matching hard copy version of the questionnaire and help notes produced for those firms in the population who did not have email addresses.

4.5 Stage 3: Administering the survey

The third and final stage in the fieldwork involved running the survey using the questionnaire developed and tested in the pilot survey. An advertisement promoting participation in the survey was placed in a number of industry publications in June and July 2008.⁶² Malcolm Wells⁶³ promoted the survey in his presentation of current tourism research within University of Tasmania, at the Tourism Industry Council Tasmania Annual conference in July 2008.

A hard copy letter of invitation for the survey was sent to the 425 short-stay accommodation firms in SABD during June 2008.⁶⁴ Eighty four firms in the population did not have an email address so they received a hard copy of the questionnaire with their letter of invitation. The

⁶⁰ These representatives are listed in Appendix 3.

⁶¹ For example, clarifying details of the costs that needed to be considered in answering questions on the costs of supplying a guest night.

⁶² The Tourism Industry Council Tasmania Newsletter and the Tourism Tasmania Newsletter, Tourism Talk.

⁶³ Adjunct Professor, School of Management, University of Tasmania.

⁶⁴ The survey letter of introduction is in Appendix 6.

remaining firms were emailed a link to the questionnaire after the initial letter of invitation. The 41 firms who had been invited to participate in the pilot survey also received letters of invitation for the survey. As the survey asked these firms about a typical week in the winter 2007 and summer 2008 quarters and the pilot survey asked about a typical week in winter and summer quarters in earlier years there would be no double counting of data.

Completed questionnaires were received from 51 firms and partially completed questionnaire received for 27 firms following the survey letter of invitation. Follow up emails were sent to those firms who had submitted a partially completed questionnaire. A copy of their partially completed questionnaire was also attached to this email to make it easier for the firms to complete the questionnaire. These follow up emails elicited one response and the firm completed the questionnaire.⁶⁵

The response rate for the survey was 19%. It was also possible to add the data from the pilot survey to the survey data because the questions in the pilot survey questionnaire contained sufficient of the core information for use in the analysis. The overall response rate including the responses from the pilot survey was 21%.⁶⁶ Tourism Tasmania note that the industry average using professional market research teams (for this population) is about 20%. The response rate is therefore consistent with the industry average.

The data from the pilot survey, survey and rack rate data was added to the firm characteristics data in SABD and stored in Excel and Access files.

4.6 Conclusions

This chapter contains a description of the process of collection of the data in SABD which will be used to examine the research questions in Chapter 1. The population of interest was determined and the firm and industry characteristics of the population were described. A field work plan was drawn up which involved three stages. The first stage involved the development of a questionnaire using feedback from discussions in a series of semi-structured interviews with industry representatives and firms. The second stage involved testing the questionnaire in a pilot survey. The third stage involved running the survey. The

⁶⁵ One firm was unable to complete the questionnaire but did offer to provide further input to the analysis if appropriate.

⁶⁶ One firm participated in both the pilot and the survey and five of the firms have more than one operation and provided data that covered all these operations. Adjusting the total responses from 90 to 84 gives a slightly lower response rate of 20%.

next step in the work is to describe the data collected from the pilot survey and the survey. This is the subject of Chapter 5.

5 Data summary of SABD

In this chapter a summary of the pilot survey, survey and rack rate data in Short Stay Accommodation Business Data (SABD) is provided. In Section 5.1 the characteristics of the firms in the respondent group and population are compared using statistical tests. This comparison exercise establishes that the respondent group is a representative sample of the population. This representativeness means that the data can be used for statistical inference. The data in SABD are summarised and are reported in Section 5.2. The characteristics of the firms in the respondent group are summarised in Section 5.3. The data summaries in Section 5.2 and 5.3 also enable the identification of correlated variables. These variables need to be used with caution in the econometric analysis reported in the results chapters. The data summary in this chapter is intended to provide a broad overview of the data. The data are further analysed using econometric techniques in Chapters 6 to 8. However there are a number of preliminary findings in this data summary relating to the broad theme of pricing decisions and the specific research questions raised in Chapter 1. These findings are presented as they appear in the order of the questionnaire sections.

5.1 Characteristics of the firms in the respondent group and population

There are 425 firms in the population and 90 firms in the respondent group. Five of the firms in the respondent group operate more than one short-stay accommodation firm. For the purposes of the data summary in this chapter and the later analysis of the data in Chapters 6 to 8 the responses from these operators are counted as single firm operations because the data provided by these firms covered all their firm operations.

The first step in analysing the data generated from the 85 firms is to compare the distribution of firm characteristics of the respondent group with the firm characteristics of the population. Consistent distributions will then indicate that a random sample of the firms has responded and the data can be used for the purposes of statistical inference. Table 5.1 shows the distribution of firm characteristics for the population and the respondent group of firms. The firm characteristics categories are consistent with those used in Table 4.1, although they are

simplified for the purposes of Table 5.1 to protect firm anonymity.⁶⁷ This simplification involves combining groups within the categories.

Table 5.1 Distribution of characteristics of firms in the population and the respondent group

	Population %	Respondent group %
Type		
B&B, cottage and guest house	24	31
Hotel, motel and self contained	76	69
Region		
Northern Tasmania	34	29
Central Tasmania	29	33
Southern Tasmania	37	38
Number of rooms		
30 rooms or more	24	23
10 to 29 rooms	37	39
5 to 9 rooms	40	38
Star rating		
3.5 star and below	40	33
4 star and above	34	35
Unrated	26	32

The distributions of characteristics in the population and respondent group are tested using Chi-squared tests for equality of distribution functions for each of the categories i.e. type, region, number of rooms and star rating.⁶⁸ The tests indicate there are no significant differences in the distribution functions at the 5% level. The results of the tests therefore indicate that there is consistency in the distribution of the firm characteristics across the population and respondent groups and the data from the survey can be used for statistical inference. The next step in the study is to describe the data collected from the survey. The summary presented here follows the order of the questions in the questionnaire to make for ease of comparison.

⁶⁷The region groupings are described in Appendix 7. There are no firms in the respondent group from the King Island or Flinders Island regions.

⁶⁸ The Chi-squared test assumes a random sample. This test involves considering a sample taken from a known population to establish whether the sample is representative. Under this circumstance, the cell counts effectively become hyper geometric rather than binomial. Under these circumstances, as n/N is relatively small ($\approx 20\%$), the Chi-squared is approximately correct.

5.2 Questionnaire sections and discussion of responses

There are seven sections in the questionnaire as shown below.⁶⁹

<u>Section</u>	<u>Question</u>
General questions about this business	1 to 9
General questions about pricing in this business	10 to 13
Sales and percentage discount from the rack rate for this business	14 to 19
Effect of an increase in rack rate on accommodation takings for this business	20 to 25
Cost of guest nights sold for this business	26 to 34
Return on assets and equity for this business	35 to 40
Competitive position of this business	41 to 43

The responses to the questions in each section are described in more details below.

5.2.1 General questions about this business

Questions 1 to 9 are designed to further test the validity of the sample and to provide background information about the business operation. Question 1 asks about the person completing the questionnaire by identifying their role in the business. The responses are shown in Table 5.2.

Table 5.2 Position currently occupied by the respondent in the business

	Chief executive officer	Business manager	Marketing manager	Financial controller	Front desk manager	Owner operator
Percentage of responses	11	18	7	3	15	47

Respondents are permitted to tick more than one category so, for example, an owner operator could tick that category and each of the remaining categories. Few of the respondents ticked

⁶⁹ As the term 'business' rather than 'firm' is used in the questionnaire, business rather than firm is used as a descriptor in the rest of this chapter.

more than one category so they clearly saw their role well defined within a category. Consequently the percentages shown in Table 5.2 provide a close representation of the distribution across the respondent group. Forty seven percent of the respondents ticked the owner operator category and only 15% the front desk manager category. The advantage of having a large group of owner operators in the respondent group is that owner operators are likely to be able to answer questions about their business whereas respondents in the other categories may be less likely to be able to do this. Having a core group of owner operators in the respondent group suggests that the business behaviour identified in the responses to the questionnaire provides an accurate reflection of business behaviour in this industry.

Question 2 deals with the number of years the business has been operating under the present owner. This question also appears in the ABS data series ⁷⁰ which makes it a familiar and easy question to answer. However data cannot be compared to the ABS data series as the ABS does not publish the responses to this question. Table 5.3 shows that almost all of the business had been operating under the current owner for at least a year, about 30% for at least 3 years and slightly more than a third for more than 5 years.

Table 5.3 Number of years operating under the present owner

Period	Percentage of respondents
Less than 1 year	7
1 year and up to 3 years	28
3 years and up to 5 years	28
More than 5 years	37

The information in Table 5.3 indicates that most of the respondents are operating established businesses. There are often large up-front fixed costs associated with entering the short-stay accommodation industry. If these costs are not amortised over a period of years they may generate misleading return on assets and equity figure. It is argued that because most businesses in the respondent group are operating established businesses this makes such misleading return on assets and return on equity figures less likely.

The next group of questions (Questions 3, 4 and 5) relate to how important financial performance, customer satisfaction and market share are judged to be in the measurement of the success of the business. The data from Question 3 are summarised in Figure 5.1.

⁷⁰ ABS Tourist Accommodation, Small Area Data, Tasmania, Quarterly Series 8635.6.55.001.

Respondents completing these questions have a choice of five possible responses in a Likert scale. These choices range from ‘very important’ to ‘not important’ and respondents can only tick one possible choice. The histogram shows the percentage of responses for each of the 5 possible choices. All three variables used to measure the success of the business are deemed either ‘very important’ or ‘important’ for at least 80% of the respondent group with customer satisfaction being the most important variable for the group.

Polychoric⁷¹ correlation tests of the relationships between these variables are generated and shown in Table 5.4.⁷² The correlations show significant relationships at the 5% level between financial performance and market share and between market share and customer satisfaction but not between customer satisfaction and financial performance. It is argued that because of these significant correlations it is likely that market share, financial performance and customer satisfaction are measuring dimensions of the same variable which is here described as business success. The responses to Question 3 however may reflect response bias since it is very unlikely that those respondents dealing directly with the customer, for example, an owner operator or a front desk manager would answer that customer service is not very important. To test for the possibility of response bias the responses to Questions 1, about who is completing the questionnaire and 3 are tested using polychoric correlations. These are shown in Table 5.5.⁷³ There is only one relationship which is significant at the 5% level. This is the correlation between the chief executive officer and customer satisfaction. These two variables are positively correlated indicating that the chief executive officers in the respondent group systematically assess customer satisfaction as being less important.⁷⁴ It is certainly possible that because the chief executive officer may have little contact with the customer they might systematically assess customer satisfaction as less important. However, since only 13% of the respondents gave a ‘chief executive officer’ response to Question 1, care should be taken in ascribing any motivation to the chief executive officer. It is argued therefore that there is little evidence of response bias in the responses to Question 3.

⁷¹ Polychoric, tetrachoric and polyserial correlation methods are used when one or all of the variables under consideration are discrete. Polychoric correlation is used for ordered-category data, tetrachoric correlation for binary data and polyserial where one variable is continuous and the other variable is ordinal. In each case the unobserved underlying latent variable is assumed to be normally distributed. By comparison the standard Pearson correlation coefficient assumes that the two variables measured are continuous and form a bivariate normal distribution population. Uebersax JS. (2006) provides a background note on these correlation methods.

⁷² Correlations between the responses to other questions in the questionnaire are also shown in Table 5.4 and will be discussed later in this section.

⁷³ Correlations between the responses to other questions in the questionnaire are also shown in Table 5.5 Table 5.4 and will be discussed later in this section.

⁷⁴ The ordering of Question 3 is such that a high score indicates the variable is less important.

Figure 5.1 Importance of financial performance, customer satisfaction and market share in measuring business success

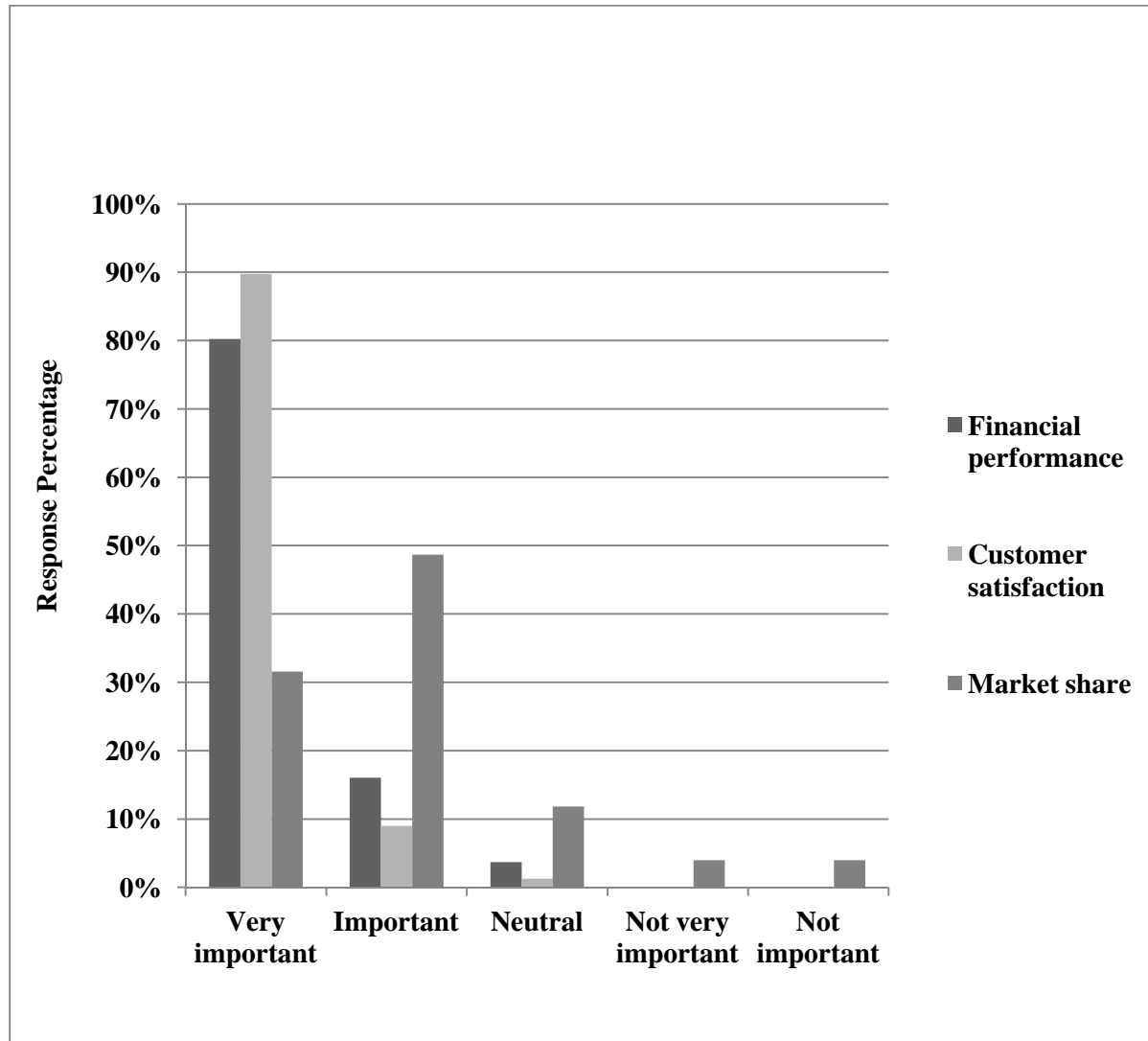


Table 5.4 Polychoric correlations for Questions 3, 7 and 11

Question	Category	Financial performance	Customer satisfaction	Market share	Make a living	Make a lifestyle change	Fairness	Market share	Reputation	Profitability
3	Financial performance	1								
3	Customer satisfaction	-0.206	1							
3	Market share	0.610*	0.499*	1						
7	Make a living	0.551*	-0.339	0.396*	1					
7	Make a lifestyle change	-0.258	0.484	0.148	0.208	1				
11	Fairness to the customer	-0.234	0.502	-0.071	-0.018	-0.301	1			
11	Market share growth	0.415*	0.007	0.685*	0.431*	0.117	0.058	1		
11	Reputation of the business	0.240	0.375	0.308*	0.194	-0.090	0.543*	0.599*	1	
11	Profitability of the business	0.723*	-0.387	0.450*	0.745*	-0.163	-0.048	0.629*	0.447*	1

* significant at the 5% level

Table 5.5 Polychoric correlations for Questions 1, 3, 7 10 and 11

Questions	Category	Chief executive officer	Business manager	Marketing manager	Financial controller	Front desk manager	Owner operator
1 and 3	Financial performance	-0.075	-0.101	-0.145	0.154	0.234	0.256
1 and 3	Customer satisfaction	0.568*	0.401	-0.950	-0.940	-0.966	-0.369
1 and 7	Market share	0.309	0.309	-0.004	-0.167	-0.369	-0.080
1 and 7	Make a living	0.025	-0.182	#	#	0.088	0.169
10 and 11	Make a lifestyle change	-0.052	0.203	0.450	0.723	-0.281	0.119
10 and 11	Fairness to the customer	0.219	0.208	0.001	-0.074	0.306	0.306*
10 and 11	Market share growth	-0.043	-0.013	0.014	-0.116	-0.407	0.126
10 and 11	Reputation of the business	-0.013	0.147	0.175	0.467	0.393	0.106
10 and 11	Profitability of the business	-0.092	-0.267	-0.040	#	-0.974	0.258

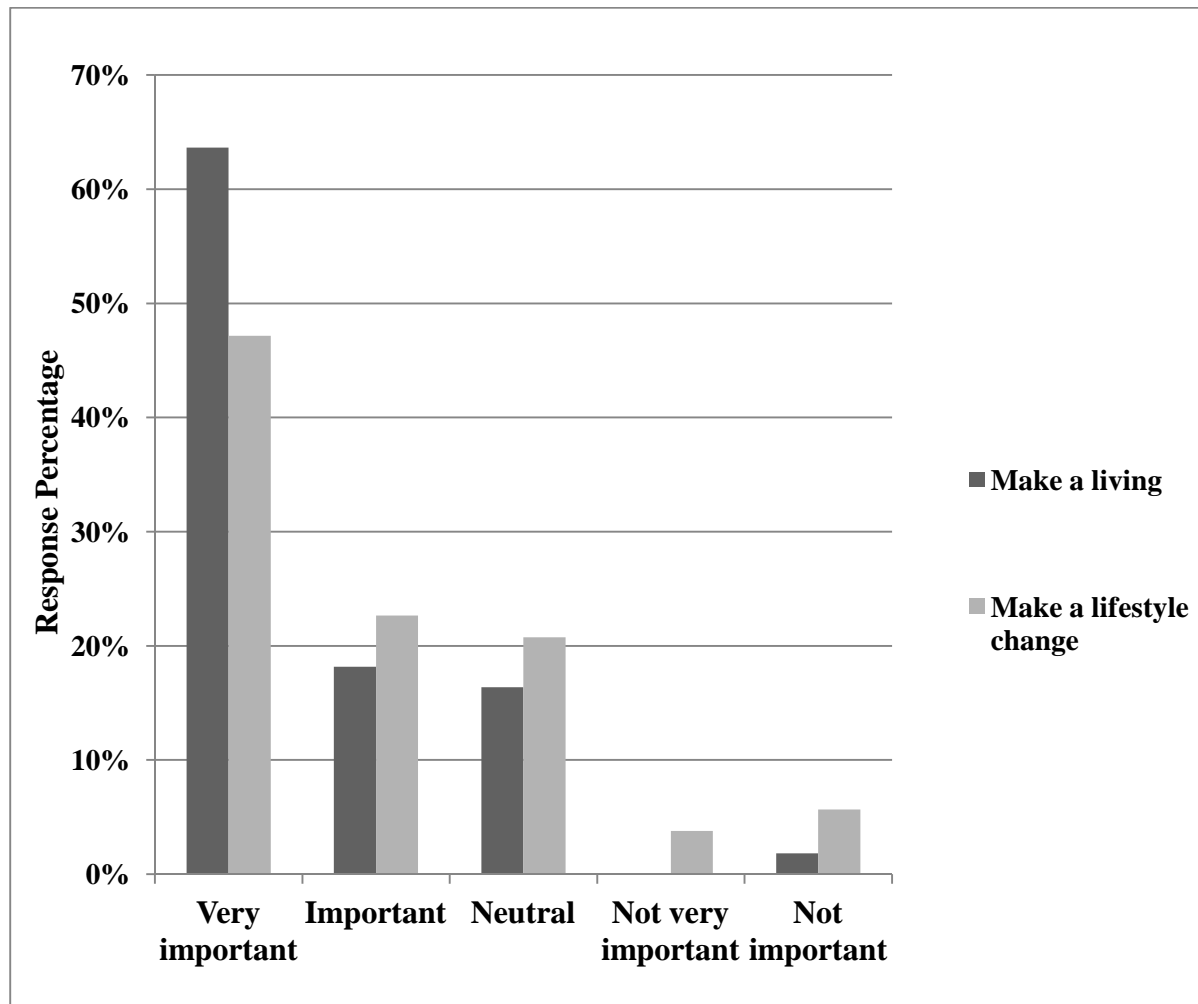
* significant at the 5% level

Insufficient data to generate correlation

An open-ended response is invited in Questions 4 and 5 where respondents are asked whether there are any other ways that they measured business success. Around 40% of the respondents say that they use other measures and these respondents provide informative feedback. The responses are reported here since they reflect findings which relate to the broad theme of the research in this thesis. A number of respondents identify internal measures such as monitoring occupancy rates, monitoring return-visits from customers and using customer feedback forms as other ways of measuring the success of the business. Staff retention is also used as a way of measuring the success of the business and a number of respondents stated that they ran staff satisfaction surveys. A number of respondents saw self satisfaction as being an important measure of their success with comments such as “self satisfaction of a job done well and knowing that our reputation is a favourable one” and “personal satisfaction and the enjoyment of operating a business where one is meeting and talking to so many different people from all over Australia and other countries”. External ways of measuring the success of the business include industry recognition and awards, industry benchmarking, community recognition and brand recognition. Other respondents consider the relationship of their business to the development of areas as tourism destinations and the associated growth in property values.

It is clear from these responses that there are many and varied ways that respondents measure success and that it is not simply measured in terms of profitability. This idea is further explored in Questions 6 to 9 where responses are restricted to the owner operators who are asked about how important making a living or making a lifestyle change is in motivating their decision to operate their business. It is possible that the question about making a lifestyle change may be less relevant or more difficult to assess for the 37% of respondents who stated that the business had been operating under the present owner for more than 5 years. Nevertheless 63% of owner operator respondents have recently begun operation of their business and are therefore likely to find the question both relevant and easier to assess. The data from Question 7 are summarised in Figure 5.2. As with Question 3 respondents completing these questions have a choice of five possible responses in a Likert scale. These choices range from ‘very important’ to ‘not important’ and respondents can only tick one possible choice. The histogram shows the percentage of responses for each of the 5 possible choices.

Figure 5.2 Importance of making a living or making a lifestyle change in motivating the decision to operate the business



It is clear from the responses shown in Figure 5.2 that owner operators see making a living as more important than making a lifestyle change but that making a lifestyle change is also important. A polychoric correlation test of these variables, shown in Table 5.4, indicates that they are not significantly correlated at the 5% level. This result suggests that they are measuring two distinct concepts of business success. To check for any respondent bias in the responses to Question 7 polychoric correlation tests are generated for the responses to Questions 1 and 7 and shown in Table 5.5. There are no significant correlations at the 5% level suggesting no respondent bias.

Polychoric correlation tests of the responses to Question 7 and those of Question 3 on business success are also generated and shown in Table 5.4. They indicate positive correlation values significant at the 5% level between making a living and financial performance and market share, but not between lifestyle change and the three measures of business success. The information in Figure 5.2 and the relationship between the responses to Questions 3 and 7 are of interest. The responses suggest that those owner operators for whom making a lifestyle change is important may be prepared to accept a rate of return below the rate they would get from a comparable investment simply to benefit from the lifestyle change. This hypothesis needs to be investigated when considering the econometric analysis of the third of the specific research questions, in Chapter 8

Questions 8 and 9 ask the owner operator if there are other factors that are important in their decision to operate their business. Around 50% of respondents said that they do use other measures and these respondents provide informative feedback. It appears that a number of the respondents are using their business to provide an income in their transition to retirement. One respondent states that the decision to operate their short-stay accommodation business has allowed them “to work for ourselves, to provide a better financial situation for our retirement”. Another respondent wants “to continue and improve the business that had been initially built and established and worked in by my parents”. One respondent states they want a “new challenge in our lives and wanted to live in Tasmania”. Another respondent wants “the chance to use their initiative and be creative”. Other respondents saw the move as one for career advancement and a chance to accumulate wealth. One respondent states that “my business partner and I purchased the business with the view of repositioning it in a new market and selling it on within five-years”. On this theme another respondent wants “to be profitable and to be able to expand into other business, buy other assets”.

The feedback on motivation provides a useful picture of the many motivations that lie behind decisions that people make about going into business. The decision to enter the short-stay accommodation industry is not simply about the return on that operator's resources. Behavioural factors also play a role in their decisions. However although the qualitative information in these responses is illuminating for the broad research theme of the thesis there are not sufficient commonalities across respondents to assign quantitative measures to these data for use in econometric analysis of the specific research questions in Chapter 1.

The next step in this summary of the data is to explore the behaviour of the respondents in terms of pricing.

5.2.2 General questions about pricing in the business

The first question in this section, Question 10, is used to check whether the person completing the questionnaire is also in a position to make pricing decisions in the business. Respondents are able to tick more than one box, although few did this, and the data are summarised in Table 5.6.

Table 5.6 Position of the person making the pricing decisions in the business

	Chief executive officer	Business manager	Marketing manager	Financial controller	Front desk manager	Owner operator
Percentage of responses	12	15	5	3	6	59

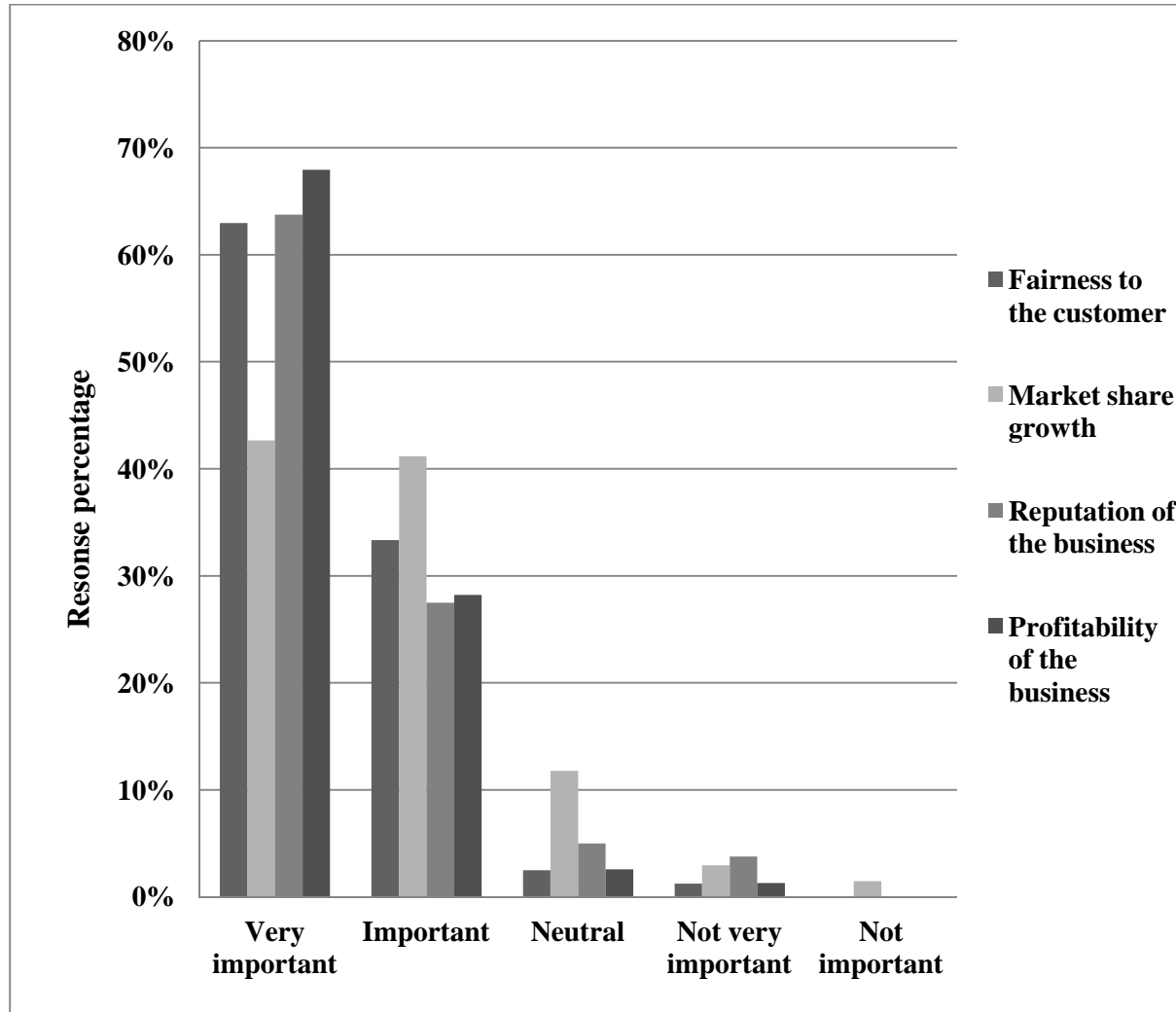
Once again the preponderance of the owner operator is apparent. By matching up the responses to Questions 1 and 10 it is possible to determine that 80% of the respondents are in a position to make pricing decisions for the business. Having a relatively large proportion of the respondents able to make pricing decisions is useful since it indicates that some confidence can be placed in the responses to questions about pricing in the questionnaire. Question 11 follows on from the question about who makes the pricing decisions and asks respondents to assess the importance of four factors in making their pricing decisions. These factors are fairness to the customer, market share growth, reputation of the business and profitability of the business.

The data are summarised in Figure 5.3. As with Figure 5.2 the histogram shows the percentage of responses for each of the 5 possible choices. The data presented in Figure 5.3 show that slightly more than 60% of respondents deemed fairness to the customer, reputation of the business and profitability of the business as very important in the pricing decisions of their business with only slightly more than 40% deeming market share growth as very important.

This finding of the lack of importance of market share is interesting in that a larger market share would be expected to generate greater market power and affect profitability through higher prices. However since the respondent group is predominantly small business with limited market power in a competitive industry then perhaps this was not so surprising. It is possible that the way that businesses use price to improve market share varies with the size of the business. Market share can be increased in two ways; by improving capacity utilisation or by adding more rooms. The larger businesses in the industry may think in terms of increasing the size of their business whereas the smaller businesses may think more in terms of improving capacity utilisation.

Polychoric correlations are generated to investigate whether there are any significant correlations between the responses from Question 11 and described in Figure 5.3 and the role of the person making the pricing decisions described in Question 10. These are shown in Table 5.5. The significant correlation at the 5% level is between the owner operator and fairness to the customer. As the owner operators predominate in the respondent group the data from Question 11 should be used with caution to avoid biased results.

Figure 5.3 Importance of fairness to the customer, market share growth, reputation of the business and profitability of the business in the pricing decisions of the business



It is also helpful to examine the relationship between the responses to Question 11 and Question 7 about making a living or lifestyle choice. Polychoric correlations are generated and shown in Table 5.4. Two relationships are significant at the 5% level. These are the relationships between the profitability of the business and making a living, and between market share growth and making a living. This confirms that for this group of businesses, profit maximisation and market share are important variables in making a living.

Questions 12 and 13 are the last questions in this section. These questions invite open-ended responses on any other factors that are important in the pricing decisions of the business. Around 30% of respondents say that there are other factors that are important and these respondents provide feedback. Costs of goods sold are considered an important factor in pricing for about 23% of these respondents. One respondent notes that “electricity and gas pricing are a fluctuating factor and my pricing hinges on the increases in these supplies but other factors such as rates and phones are more stable and do not occur in such large dollar figures”. Competitive situation is considered an important factor for about 27% of the respondents. For instance one respondent stated that “when pricing rooms competitiveness with like business is considered”, another noted that “the business must ensure that we are competitive relative to other accommodation” and a third stated “what we can safely charge with what our competition will allow”. A number of respondents added to the responses in Question 11 by re-stating the importance of fairness to the customer with comments such as “perception of value for money by customer” and “we believe accommodation costs are a big deterrent to visitors and it is essential that operators keep costs to a level that provides a fair income”. Several respondents have relatively comprehensive lists of factors that are important in pricing decisions such as “what the market will pay, room rate opposed to marketing spend, yield per room once commissions, fixed room costs and expenses have been taken” and “competitor competition, competitor analysis, future local events, forecasted occupancy, past occupancy, revenue and average room rate figures”. Only one respondent mentions growth as an important factor in pricing decisions.

This anecdotal feedback on the other factors that affect pricing is useful and it is possible to establish two common themes. These themes are that costs and competition are important factors in pricing decisions for many respondents. It was decided not to attempt to convert this qualitative information into quantitative data as questions have already been included in the questionnaire about costs and competition.

It is also possible that a number of the variables in Questions 3 and 11 are correlated. It is useful to generate final polychoric correlations showing the relationship between the variables in Questions 3 and 11. These are shown in Table 5.4. The correlation matrix shows that there are significant correlations at the 5% level between a number of the variables. This finding suggests that the variables should be used in combination with caution to avoid multicollinearity in the econometric analysis.

Considering the responses to Questions 3, 7 and 11 and the correlations in Table 5.4 it is noted that the only variable that is not correlated with any of the other variables is the variable 'making a lifestyle change' from Question 7. It would appear that this is the only variable measuring a unique factor in this respondent group. The remaining variables are all correlated to some degree with each other. This result suggests that these variables are all measuring the same dimension. Figure 5.1, Figure 5.2 and Figure 5.3 show the responses for the variables in Questions 3, 7 and 11 are clustered around the 'very important' choice in the Likert scale of choices. This is less pronounced with the 'making a lifestyle' change variable in the Question 7 responses. As the responses to the three questions show limited variation across the choices and because many are significantly correlated only the making a lifestyle change variable from Question 7 will be used in the econometric analysis in the investigation of the specific research questions.

The next step in the investigation of the data from the survey is to consider the responses to the sales and percentage discount from the rack rate questions.

5.2.3 Sales and percentage discount from the rack rate for this business

Questions 14 to 19 require the respondent to estimate the number of guest nights sold at the rack rate, below the rack rate and the average percentage discount on those sales below the rack rate. The rack rate (or indicative price) is the advertised price where no discount is offered. There are three sets of questions. Questions 14 and 15 consider sales through the four distribution channels. The 'wholesalers and online aggregators' are those distributors who take 18% and more commission e.g. Tasmania's Temptations and Expedia. The 'retailers and online intermediaries' are those distributors who take less than 18% commission e.g. Wotif.com. Questions 16 and 17 ask about corporate and leisure sales and Questions 18 and 19 about first-visit and return-visit sales. These three sets of questions are repeated for a

typical summer and typical winter week. Summary statistics are generated from this data for each of these groupings and are shown in Table 5.7.

The mean sales at the rack rate for the summer and winter weeks across all businesses are calculated for each market group. For example, there are on average 21 ‘wholesalers and online aggregators’ guest night sales at the rack rate in a typical summer week. The percentage of sales at the rack rate based on the mean number of sales at the rack rate is then calculated. For example, the 21 ‘wholesalers and online aggregators’ guest night sales at the rack rate represent 19% of the 114 sales at the rack rate to all customers. The mean sales below the rack rate and percentage of sales below the rack rate is then calculated using the same process as for the rack rate sales. Finally the average percentage discount from the rack rate for those sales below the rack rate is calculated for each market group. For example, those ‘wholesalers and online aggregators’ customers who paid a price below the rack rate received a discount on average of 35% below the rack rate.⁷⁵ Some respondents did not complete all sets of questions in this section so the totals across the groups may be inconsistent.⁷⁶

The data in Table 5.7 show that, for the three groupings, mean sales at the rack rate are higher in the summer than in the winter. For example, there are, on average, 59 sales to corporate and leisure customers in the summer but only 21 sales, on average, to corporate and leisure customers in the winter. However mean sales below the rack rate are similar across winter and summer for all the market groups. For example, mean sales below the rack rate to corporate and leisure customers are 55 in the summer and 50 in the winter. The business therefore makes additional sales in the summer compared to the winter but these are all at the rack rate. Finally the mean percentage discount on the sales below the rack rate for the three groupings is lower in the winter than in the summer. For example, the mean percentage discount for the corporate and leisure grouping is 56% in the summer and 71% in the winter. This result suggests that customers may be more sensitive to price in the winter than in the summer. This finding casts some light on the investigation on the specific research questions in Chapter 1 suggesting the business has the information to practice price discrimination across the winter and summer seasons.

⁷⁵ If the rack rate is \$300 the wholesalers and online aggregators customer who receives a discount pays, on average, \$195.

⁷⁶ Forty five percent of the respondents completed Questions 14 and 15 on sales through the distribution channels, 40% completed Questions 16 and 17 on corporate and leisure sales and 30% completed Questions 18 and 19 on first-visit and return visit sales. As the largest proportion of the respondents completed Questions 14 and 15 the totals for the distribution group best represent the sales for the respondent group.

Table 5.7 Aggregated data for sales and discounts for the three groupings

Period	Group	Mean# sales at the rack rate	Percentage of sales at the rack rate	Mean sales below the rack rate	Percentage of sales below the rack rate	Mean percentage discount from rack rate	
Summer	Wholesalers and online aggregators	21	19	12	22	35	
	Retailers and online intermediaries	7	6	15	29	68	
	Direct via own website, telephone or fax	62	54	20	38	24	
	Direct via walk-ins	24	21	5	10	18	
	Total	114		52		36	*
Winter	Wholesalers and online aggregators	8	17	10	20	56	
	Retailers and online intermediaries	4	8	16	33	82	
	Direct via own website, telephone or fax	23	51	19	39	45	
	Direct via walk-ins	11	24	4	8	27	
	Total	44		49		53	*
Summer	Corporate nights	6	10	32	57	84	
	Leisure nights	53	90	24	43	31	
	Total	59		55		56	*
Winter	Corporate nights	2	9	33	65	94	
	Leisure nights	19	91	17	35	48	
	Total	21		50		71	*
Summer	Return visit nights	14	19	12	24	46	
	First visit nights	59	81	37	76	38	
	Total	73		49		42	*
Winter	Return visit nights	5	24	10	20	69	
	First visit nights	15	76	41	80	74	
	Total	19		52		72	*

Mean sales are calculated using the number of sales for each business in the grouping.

* Indicates the mean percentage discount for the grouping

Table 5.7 shows that there are few sales at the rack in both winter and summer via ‘retailers and online intermediaries’ relative to the other distribution channels. Those customers buying via this channel receive the largest percentage discount of all the distribution channels, for example an average discount of 68% in the summer and 82% in the winter. The size of these discounts relative to the other distribution channels suggests that customers buying via the ‘retailers and online intermediaries’ channel are more sensitive to price than customers buying via the other distribution channels. Conversely there are few sales in winter and summer below the rack rate to walk-in customers relative to sales via the other distribution channels. The walk-in customers who pay a price below the rack rate, receive the lowest percentage discount from the rack rate of the distribution channels, for example 18% in the summer and 27% in the winter. This result suggests that the walk-in customers are the least sensitive to price across the distribution channels. Finally the larger discount in winter across all the distribution channels suggests that customers may be more sensitive to price in the winter than in summer.

Within the corporate and leisure grouping, the data in Table 5.7 show that corporate customers receive the larger proportion of sales below the rack rate, 57% in winter and 65% in the summer. The corporate customers also receive a larger discount than the leisure customer on sales below the rack rate, 84% in the summer and 94% in the winter. These are relatively large discounts compared to the discounts for the other customer groups. However the mean percentage discounts for the combined corporate/leisure grouping are 56% in the summer and 71% in the winter which are close to the mean percentage discounts for the two other groupings i.e. distribution channel groupings and first-visit/return-visit groupings. The pattern of discounting observed for corporate customers suggests that these customers may be more sensitive to price than leisure customers since they are able to secure a larger percentage of sales below the rack rate and a lower price for those sales than the leisure customer. The observation concerning corporate customer sensitivity contrasts with the pattern of discounting observed in the airline industry where business seats intended for corporate customers are more expensive than economy seats intended for leisure customers. In the accommodation industry in Tasmania it is possible that corporate customers are more likely to book accommodation in the larger businesses in the industry, such as hotel chains which have relatively high rack rates, but then receive sizeable discounts on these rack rates. Additionally if the larger hotels incur large fixed costs they may be more willing to cut prices to fill capacity than relatively smaller businesses.

Finally, for the return-visit and first-visit grouping, the return-visit customers receive a larger discount from the rack rate than the first-visit customers in the summer, 46% as opposed to 38% discount. However this pattern is reversed in the winter when the return-visit customers receive the smaller discount from the rack rate, 69% as opposed to 74%. There is little difference across winter and summer in terms of percentage of sales at the rack rate and below the rack rate for the return-visit and first-visit customers. The results on the discounts provide some indication of differences in price sensitivity across the return-visit and first-visit customers.

The summary data in Table 5.7 therefore provide some interesting findings. There is clearly some variation across the customer groupings in terms of both pricing at the rack rate, pricing below the rack rate and discounting from the rack rate. The variation suggests differences in sensitivity to price that warrants further analysis.

Calculation of actual prices using the data from Questions 14 to 19 requires data on the rack rates for each of the businesses who responded to the survey. This data was collected from the Discover Tasmania website for the two quarters of the pilot survey and the two quarters of the survey.⁷⁷ All respondents had their rack rates published on the Discover Tasmania website by the time of the pilot survey. A business may have many different rack rates which reflect prices for their different types of rooms therefore the number of rooms of each type was also obtained from the Discover Tasmania website. The rack rate data and the number of types of room data are used to calculate the average rack rate which is a weighted average.⁷⁸ The data from questions 14 to 19 and the rack rate data are further explored in the analysis in Chapters 6 and 7.

The data from Questions 14 to 19 are also used to calculate occupancy rates for comparison with data the ABS data series⁷⁹. This process provides a further check that the respondent sample is representative of the short-stay accommodation population of business in Tasmania with five or more rooms. The average occupancy rate for the respondent group was 30% in the typical winter week and 44% in the typical summer week. An average occupancy rate of 49% for the quarter ending 30 September 2007 and 70% for the quarter ending 31 March 2008 is reported in the ABS data series.⁸⁰ The two sets of occupancy rates are not strictly comparable since the ABS data series contains a sub-set of the SABD population. This issue

⁷⁷ Viewed at <http://www.discovertasmania.com.au>.

⁷⁸ Details of this calculation are contained in Appendix 9

⁷⁹ ABS Tourist Accommodation, Small Area Data, Tasmania, Quarterly Series 8635.6.55.001

⁸⁰ These quarters match with quarters investigated in the survey.

was discussed in the previous chapter. It is not possible to further disaggregate the survey occupancy data to examine the rate across the regions and compare these rates to those in the ABS data series across the regions. This is because further disaggregation would not preserve the anonymity of the respondents. It is possible that the bed and breakfast, guest house and self contained business added to the ABS data series to generate SABD have lower occupancy rates than the business in the ABS series which accounts for the differences in occupancy rates between the two series. Anecdotal feedback from the industry representatives and business in the earlier stages of field work supports this account of the apparent differences in the occupancy rates between the two series. The difference in the occupancy rates between the summer and winter is however preserved across SABD and the ABS data series indicating that the respondent group is representative of business with 5 or more rooms in the short-stay accommodation industry.

The next section of the questionnaire investigates the change in accommodation takings after the business increases their rack rate by 10%. These are the questions that investigate the elasticity of demand of customers. It is this data that the business could use for price discrimination purposes.

5.2.4 Effect of an increase in rack rates on accommodation takings

Questions 20 to 25 are designed to assess how sensitive the different market groups are to an increase in the rack rate. The groupings used in Table 5.7 – distribution channel / corporate / leisure / first-visit / return-visit – are repeated in this section. The assumption made when designing these questions is that the business is changing their own rack rate and that the estimate of the impact is the impact of this change and not the impact had all businesses raised their rack rates. Therefore the responses to these questions should provide some measure of the residual demand curve for the business. An increase in accommodation takings indicates inelastic demand, a decrease in takings indicates elastic demand and no appreciable change in takings indicates unit elastic demand.⁸¹

Table 5.8 summarises the data from Questions 20 to 21. The data in Table 5.8 show that, for example, 39% of respondents stated that an increase in the rack rate of 10% would result in an increase in takings compared to 36% who stated there would be no change in takings.⁸²

⁸¹ The industry description of revenue is used in these questions i.e. accommodation takings.

⁸² The percentages therefore sum to 100 down the columns.

Table 5.8 Distribution of responses for changes in takings after a 10% increase in the rack rate for distribution channel groups

	Percentage of responses			
	Wholesalers and online aggregators	Retailers and online intermediaries	Direct via own website, telephone or fax	Direct via walk- ins
<u>Summer</u>				
Increase in takings	39	36	40	36
No appreciable change	36	32	38	43
1% to 10% fall in takings	20	20	16	17
More than 10% fall	5	11	6	4
<u>Winter</u>				
Increase in takings	12	14	17	13
No appreciable change	32	21	28	27
1% to 10% fall in takings	29	38	32	40
More than 10% fall	27	26	23	20

Across all distribution channels a smaller percentage of respondents indicated that an increase in the rack rate would increase takings during the winter compared to the summer. For example 36% of respondents indicated that takings would increase in the summer for the ‘retailers and online intermediaries’ channel whereas only 14% indicated takings would increase for this channel in the winter. The difference in responsiveness between winter and summer across all distribution channels is also consistent with the data in Table 5.7, which shows that the mean percentage discount for the distribution channel grouping is 36% in the summer and 53% in the winter. This suggests that demand is more elastic in the winter than summer.

Now turn to variation in price sensitivity across distribution channels. The data in Table 5.8 also indicate that, summer customers using the ‘retailers and online intermediaries’ channel are the most sensitive to increases in the rack rate in the summer of all the distribution channels with 11% of respondents indicating that takings would fall by more than 10%. In comparison only 4% of respondents indicated that takings from walk-in customers would fall by more than 10% from walk-in customers. The patterns of responsiveness are consistent

with the discounts observed in Table 5.7 where customers using the ‘retailers and online intermediaries’ channel in the summer receive a greater discount than walk-in customers. As with the summer and winter differences the patterns across the distribution channels suggests that those customers using the ‘retailers and online intermediaries’ channel have more elastic demand than walk-in customers.

Table 5.9 summarises the responses for the corporate and leisure customer grouping from Questions 22 and 23. As with Table 5.8 the column percentages sum to 100. Table 5.9 shows that 43% of respondents indicate that takings from leisure customers would rise and 20% indicate that takings from corporate customers would rise with an increase in the rack rate. These patterns are consistent with those observed in Table 5.7 with a relatively large proportion of discounted sales being made to the corporate customer in the summer. These observations on responsiveness to price and discounts from the rack rate suggest that, in summer, the corporate customer is more sensitive to price than the leisure customer. Additionally the greater sensitivity to an increase in the rack rate in the winter seen in Table 5.9 is also reflected in greater discounting for both groups in the winter as seen in Table 5.7. The summer and winter variation is also consistent with the summer and winter variation observed across the distribution channel grouping in Table 5.8.

Table 5.9 Distribution of responses for changes in takings after a 10% increase in the rack rate for the corporate/leisure groups

	Percentage of responses	
	Corporate customer	Leisure customer
<u>Summer</u>		
Increase in takings	20	43
No appreciable change	54	37
1% to 10% fall in takings	24	15
More than 10% fall	2	4
<u>Winter</u>		
Increase in takings	10	12
No appreciable change	40	30
1% to 10% fall in takings	35	37
More than 10% fall	15	21

Table 5.10 summarises the responses for the return-visit and first-visit customer grouping from Questions 24 and 25. As with Table 5.8 the column percentages sum to 100. Both groups of customers are more sensitive to an increase in the rack rate in the winter than the summer. This observation is consistent with the winter and summer variation observed in the distribution channel and corporate and leisure groupings. The variation in responsiveness to an increase in the rack rate observed in Table 5.10 is also reflected in the discounting observed in Table 5.7, with a smaller proportion of sales below the rack rate to the return-visit customers in the summer relative to the first-visit customers, and a larger proportion of sales below the rack rate to the first-visit customer in the summer relative to the first-visit customer in the winter.

Table 5.10 Distribution of responses for changes in takings after a 10% increase in the rack rate for the return visit/first-visit groups

	Percentage of responses	
	Return-visit customer	First-visit customer
<u>Summer</u>		
Increase in takings	30	38
No appreciable change	43	43
1% to 10% fall in takings	23	13
More than 10% fall	4	6
<u>Winter</u>		
Increase in takings	13	15
No appreciable change	36	35
1% to 10% fall in takings	36	30
More than 10% fall	15	20

The data from Questions 20 to 25 offer some indication of the possibilities in terms of econometric analysis since responsiveness to price is central to the analysis of price discrimination. Clearly there are patterns observed in the sensitivity of customers to changes in the rack rate, sales at the rack rate and below the rack rate and discounting on those sales. This variation suggests there is the potential for exploring the research questions in Chapter 1. However there is one missing piece of information which is the marginal cost to supply a guest night across the different groups and time periods. The next step in is to investigate the marginal cost data collected from the survey.

5.2.5 Costs of guest nights sold

The cost data collected from the survey using Questions 26 to 34 focuses on marginal costs – costs that vary when a guest night is sold. These data can then be used in conjunction with the data collected on prices (rack rates), discounting from the rack rate and sensitivity to changes

in the rack rate already described in sections 5.2.3 and 5.2.4 in order to analyse business' pricing strategies. The same three groupings as in the earlier questions on prices (rack rates) and price sensitivity are used in Questions 26 to 34. These groupings are the distribution channel used to sell a guest night and whether the guest night is a corporate, leisure, return-visit or first-visit night. Respondents were asked to consider only those costs that would be incurred if the room was not empty for the night. Examples of such costs would be room cleaning, linen and credit card charges and breakfasts. Although there may be systematic differences in marginal costs across different types of establishments – for example B&Bs include breakfasts – the issue is whether marginal costs differ across distribution channels. Respondents were also asked to exclude commission when assessing the marginal cost of a guest night. The analysis of direct price discrimination needs to incorporate variations in marginal cost since variations in prices that reflect variations in marginal cost need to be eliminated. If businesses with the same marginal cost are charging prices that vary across the distribution channel and the corporate, leisure, return-visit and first-visit groupings then there would be evidence of direct price discrimination.

In Questions 26 to 28 the respondents are asked to assess the cost of a guest night sold across the distribution channels relative to the cost of a guest night sold to a walk-in customer. The responses are shown in Table 5.11. The percentages sum to 100 down the columns. Respondents indicated that sales through 'wholesalers and online aggregators' incurred the highest marginal cost relative to walk-ins and that sales direct via own website, telephone or fax had the lowest marginal cost relative to walk-ins in both summer and winter. The pattern of responses to these questions suggests that there are marginal costs, other than commission, which are incurred when selling guest nights through distribution channels other than to the walk-in distribution channel. For example, there may be additional administration costs, such as bookkeeping costs, associated with selling a guest night through the wholesaler and online aggregators channel rather than directly to walk-in customers.

Table 5.11 Distribution of responses for difference in costs across the distribution channel grouping

	Percentage of responses		
	Wholesalers and online aggregators	Retailers and online intermediaries	Direct via own website, telephone or fax
<u>Summer</u>			
More than 10% higher than walk-ins	68	38	10
1% to 10% higher than walk-ins	14	33	48
Same as cost of walk- ins	5	14	29
1% to 10% lower than walk-ins	5	5	14
More than 10% lower than walk-ins	9	10	0
<u>Winter</u>			
More than 10% higher than walk-ins	50	39	6
1% to 10% higher than walk-ins	22	33	33
Same as cost of walk- ins	17	17	50
1% to 10% lower than walk-ins	6	6	11
More than 10% lower than walk-ins	6	6	0

The responses from the remaining questions on marginal cost, Questions 32 to 34, are summarised in Table 5.12. The percentages sum to 100 down the columns. The first column shows the responses to Questions 29 to 31. In these questions respondents were asked to assess the marginal cost of selling a corporate guest night relative to the marginal cost of selling a leisure guest night. In the summer and winter around 70% of respondents state that marginal cost does not vary across corporate and leisure nights. Thirty percent of respondents state that marginal cost is lower for the corporate guest night. This lower marginal cost could arise from the fact that information about the customer may have been collected on an earlier visit, such as that required for credit card billing, so does not require setting up with each stay. In the winter a similar pattern is observed but with a few respondents stating that some

corporate nights cost slightly more in the winter than summer. These could be costs associated with, for example, additional heating for corporate customers.

In Questions 32 to 34 respondents were asked to assess the cost of selling a return-visit night relative to a first-visit night. A summary of the responses is also shown in Table 5.12.

Table 5.12 Distribution of responses for difference in costs across the corporate, leisure, return-visit and first-visit customer groupings

	Corporate night relative to leisure night	Return-visit night relative to first-visit night
<u>Summer</u>		
More than 10% higher	0	2
1% to 10% higher	0	6
Same cost	71	73
1% to 10% lower	21	16
More than 10% lower	8	4
<u>Winter</u>		
More than 10% higher	0	0
1% to 10% higher	4	6
Same cost	70	73
1% to 10% lower	21	14
More than 10% lower	6	8

As with the corporate and leisure analysis of costs the largest percentage of respondents stated that marginal cost did not vary between the return-visit and first-visit night. Twenty percent of respondents state that, where marginal cost varies in the summer, it is lower for the return-visit night. This observation suggests that, as with the corporate customers, there may be information that the business retains for return-visit customers which allows them to make savings in marginal cost for these customers. A few respondents did state however that return-visit customers are more costly than first-visit customers in the summer and winter.

This could be because businesses are providing additional services, such as tour arrangements, for loyal customers in the summer.

The variations in costs observed for the three customer groupings provide further useful data for the analysis of the specific research questions in Chapter 1. The data on prices, quantities, price sensitivity and costs are used to investigate direct price discrimination in Chapters 6 and 7. The next step in this data summary is to consider the returns to the business.

5.2.6 Return on assets and equity

Questions 35 to 40 are used to generate information on the return on assets and return on equity of the business for the quarter ending 30 September 2007 and 31 March 2008. The data from these questions will be used for the investigation of the third of the specific research questions. This question asks about the factors that determine profitability in the short-stay accommodation industry. Figure 5.4 shows the distribution of responses for the return on assets data from Question 35. The figure shows the percentage of respondents who selected each of the five possible choices in the Likert scale used for the questions. The distribution of responses for return on assets is bi-modal for winter and summer with the peaks focused on more than 10% and 3% to 5%. There is a marked difference in the returns for summer and winter with lower returns overall in the winter.

Figure 5.5 shows the distribution of responses for the return on equity data from Question 38. The distribution of responses for return on equity is also a bi-modal distribution although less so than the return on assets distributions. Again, there is a marked difference between the summer and winter with returns on equity being lower in the winter. It is not clear *a priori* why the distributions are bi-modal but the variation across the responses invites further analysis. There were many factors that are likely to affect returns and these factors are investigated in Chapter 8.

Figure 5.4 Distribution of responses for the return on assets

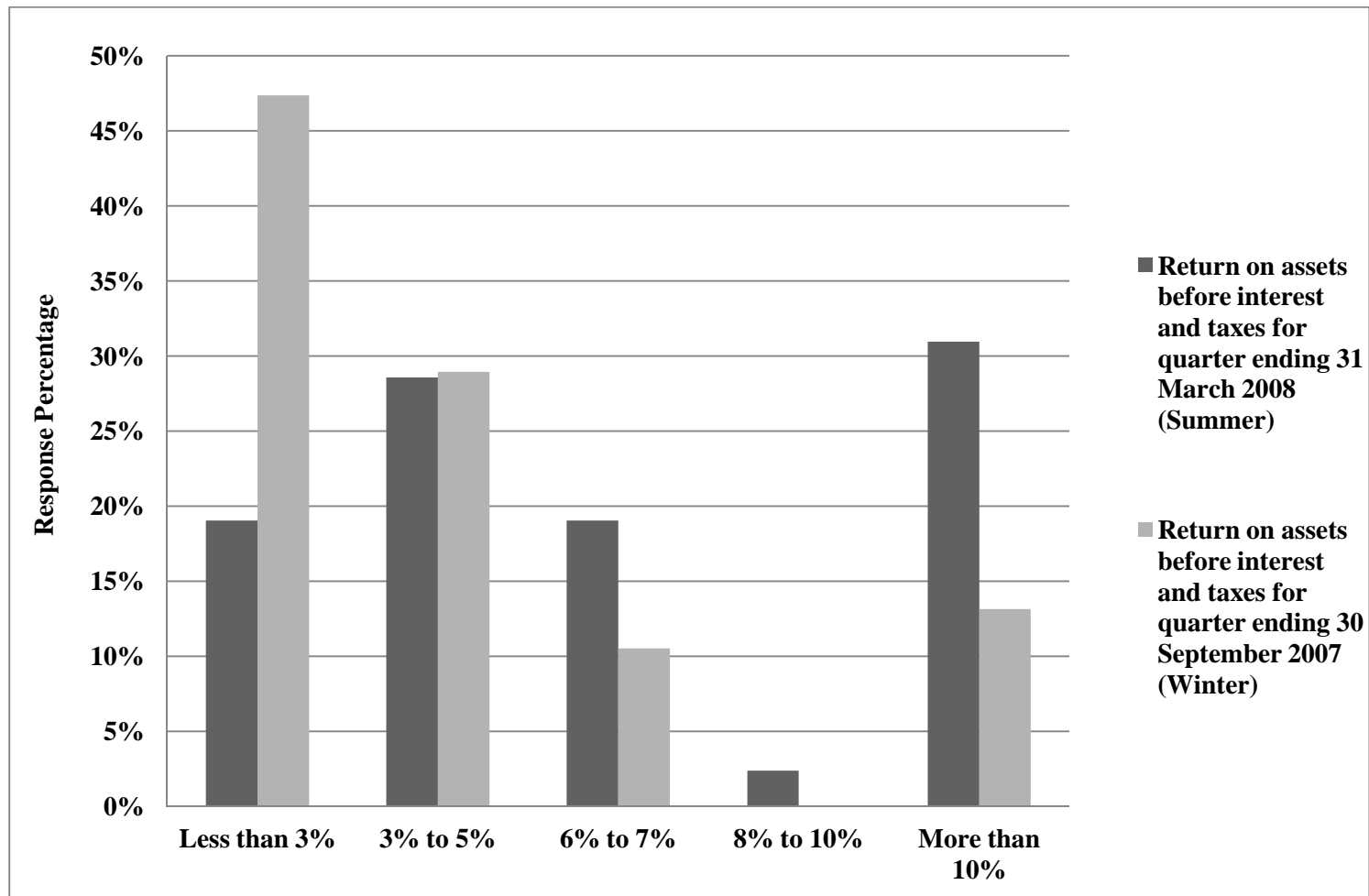
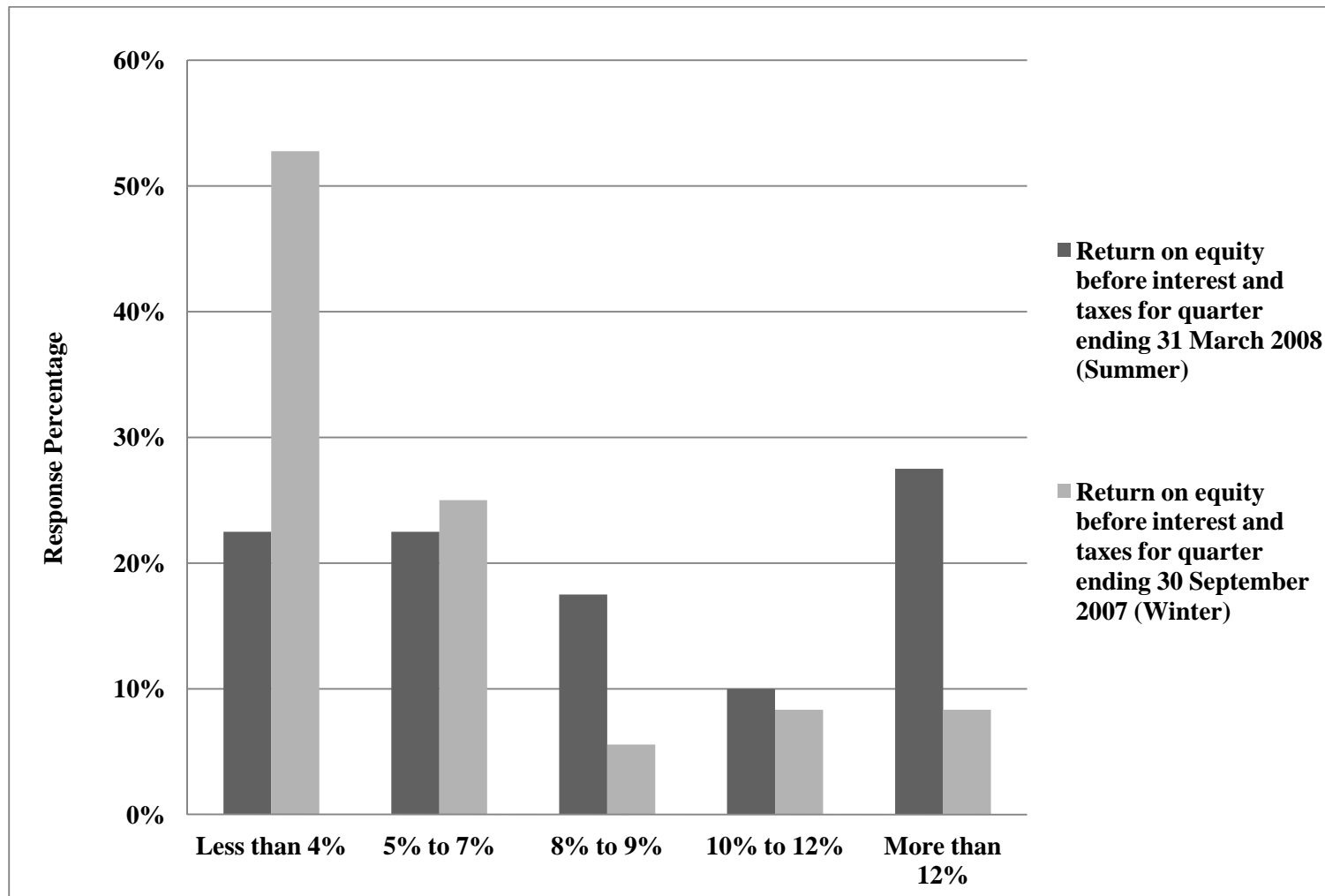


Figure 5.5 Distribution of responses for the return on equity



Since the return on equity is simply the return on assets with the borrowings removed some relationship between the two variables would be expected. Consider the stylised balance sheet for a business: Assets = Liabilities + Equity.

It must be the case that $\frac{Profit}{Equity} \equiv \frac{Profit}{Assets - Liabilities} > \frac{Profit}{Assets}$. If the business has no

liabilities then the return on assets will be equal to the return on equity but with liabilities the return on equity must be higher than the return on assets. Allowance for borrowing in the industry was incorporated into the design of the questions used to generate in data in Figure 5.4 and Figure 5.5 with the boundaries being higher for the return on equity. For both measures of returns the business were asked to use profit before tax and interest.

The two rates of return are compared by considering the data in Figure 5.4 and Figure 5.5. Seventy percent of respondents indicate no difference between their return on assets and return on equity suggesting a situation of no liabilities, 10% indicate that their return on equity is higher than their return on assets suggesting some borrowing and 20% indicate that their return on equity is lower than their return on assets. This latter result suggests the business operator may be confused over what their liabilities are, giving erroneous values for the return on equity. In view of this the return on equity data needs to be used with caution in the econometric analysis.

To elicit further information on the factors that affect the returns for the business during the two quarters of the study, two open-ended questions were included in the survey questionnaire. In Questions 37 respondents are asked about any significant factors that affected return on assets and in Questions 40 respondents are asked about any significant factors that affected return on equity. Twenty two percent of respondents stated that there were significant factors that affected their return on assets during the two quarters. Four respondents identified internal capital improvements such as “investment into onsite developments” and “significant refurbishment of rooms” and “renovating showers, new beds, Austar, new carpets and televisions”. Another respondent had “set up a website, listed on the last minute sites and organised a site manager”. A number of respondents identified external factors that significantly affected their return on assets such as the “ending of the Spirit of Tasmania Sydney to Devonport ferry services and the detrimental effect it had on Tasmanian tourism” and “the decrease in customer confidence of Tasmania as a destination”. “Petrol prices and low-fare flights” were also factors identified by one respondent affecting return on assets whilst another respondent “balanced capital works for the business with an extremely

buoyant year”. Only 12% of respondents indicated that there were significant factors that affected their return on equity. There was no additional information in these responses, simply a repetition of the factors that affected return on assets. This is to be expected given the relationship between return on assets and return on equity and the likelihood that the factors that affected return on assets also affected return on equity. These anecdotal observations on other factors affecting returns are interesting, although no general themes emerge. It is possible that respondents are expensing these items in the same quarter rather than treating them as an investment and taking the quarterly depreciation into account. It is not possible to ascertain whether this is the case but since the proportion of respondents identifying significant factors is relatively small any bias in the analysis should be relatively small. There are however no major common significant factors identified by the respondents that need to be incorporated into the analysis in Chapter 8. The final step in this summary of the data from the survey is to investigate the data from the questions which assessed the competitive position of the business from the perspective of the respondents.

5.2.7 Competitive position of the business

The responses to Questions 41 and 42 concern the competitiveness of the short-stay accommodation industry. The industry is imperfectly competitive with business having some limited market power associated with the differentiation of the service they provide. The limited market power means it is very difficult for business to act strategically. Therefore respondents are not asked about strategic behaviour in the questions about competitiveness. Respondents are asked to consider the degree of competition with respect to their close competitors. The close competitors were judged to be those businesses within Tasmania running services which are similar in quality and price range. The responses to Questions 41 to 42 are summarised in Table 5.13. The figures in the columns show the percentage of respondents choosing a particular option in the Likert scale of choices. The percentages sum to 100 down the columns.

Table 5.13 Distribution of responses on degree of competition

	Degree of competition during quarter ending 31 March 2008	Degree of competition during quarter ending 30 September 2007
Very competitive	37	46
Competitive	43	28
Neutral	14	15
Not very competitive	6	9
Not competitive at all	0	2

Most respondents judged their business to be in a very competitive or competitive environment with winter being a more competitive environment than summer. This result is plausible since during the winter visitor numbers to Tasmania fall meaning that businesses are competing for a smaller number of potential customers. Question 43 invited respondents to describe any factors that affected the competitiveness of their business for the two quarters. Twenty two percent of respondents indicated that there were significant factors that affected competitiveness for those two quarters, although there are no common themes that emerge from these qualitative comments. Two respondents identified the changes occurring in the way that rooms were distributed and noted that “listing with the last minute sites helped fill empty rooms” and “the industry is experiencing a revolution in booking methods and most customers seem to feel more comfortable booking on-line, than using the traditional methods”. Another two respondents made more general comments on the competitiveness of the industry stating that there were “too many operators with not enough customers” and “too many cowboy operators who open up without accreditation or council approval”. The lack of common themes means that there are no significant factors that affected competitiveness of business in the industry during these quarters that need to be incorporated into the analysis in Chapters 6 to 8.

The responses to the questions on competitiveness complete the summary and initial observation of the data from the survey. The next step is to investigate the business characteristics of the respondent group so that differences in the business that can be attributed to these characteristics can be incorporated into the analysis in Chapters 6 to 8. If there is something systematic about pricing related to, for example, the size of the business this had to be accounted for in the analysis.

5.3 Analysis of the business characteristics data

This investigation of the business characteristics of the respondent group using correlation analysis develops the information in Table 5.1 and forms the final section of this chapter. Businesses are described according to their type, location, star rating and number of rooms. The two type and two star rating groupings used are consistent with those in Table 5.1.⁸³ The three regions in Table 5.1 are expanded to 7 regions.⁸⁴ The number of rooms variable, which is a continuous variable, with the type, location and star rating variables generates 11 business characteristics variables.

There are two issues arising from using this matrix of business characteristics data in econometric analysis. Firstly, including 11 business characteristics may make econometric modelling problematic because it reduces the degrees of freedom. Secondly, if any of the business characteristics variables are correlated this may pose multicollinearity issues. The next step is therefore to examine the data for the business characteristics variables by generating tetrachoric and polyserial correlations of the variables. The correlation matrix is shown in Table 5.14. Those correlations that are significant at the 5% level are highlighted. The correlation analysis allows for some consideration of which variables can be dropped from any econometrics analysis, if not significant, and which should be retained, despite possibly being insignificant. The type variables are correlated with both the star rating variables and the number of rooms variable. This observation will be re-visited in the econometric analysis in Chapter 7.

⁸³ These are B&B, cottage and guest house; Hotel, motel and self contained; 3.5 star and below; 4 star and above.

⁸⁴ The regions are described in Appendix 8.

Table 5.14 Correlation matrix of the business characteristics data

Tetrachoric Correlations						Polyserial Correlations
	B&B, cottage and guest house	Hotel, motel and self contained	3.5 star and below	4 star and above	Unrated	Number of rooms
B&B, cottage and guest house						-0.8640*
Hotel, motel and self contained						0.8703*
3.5 star and below	-0.4353*	0.4353*				0.2284
4 star and above	0.4350*	-0.4350*				-0.0298
Unrated	-0.0472	0.0472				-0.2683
Derwent	0.4725*	-0.4725*	-0.5506*	0.2509	0.1975	-0.7906*
Devonport	-0.1009	0.1009	-0.0669	-0.3444	0.3498	0.0174
Hobart	-0.0388	0.0388	0.1176	-0.0388	-0.0831	0.1065
Launceston	-0.2960	0.2960	0.1293	0.2011	-0.3868	0.4689*
Sthelens	-0.3907	0.3907	-0.3611	-0.1624	0.4309	-0.0976
Stanley	0.0850	-0.0850	0.5575*	-0.163	-0.5592*	-0.0976
Tasman	0.0330	-0.0330	-0.3611	0.0330	0.2661	-0.7122*

* Significant at the 5% level

5.4 Conclusions

This chapter has provided a summary of the data from the survey. Prices and price sensitivity are found to vary across the distribution channel, corporate, leisure, first-visit or return-visit customer groups. Some businesses report variation in marginal cost when selling guest nights to customers through different distribution channels or to customers identified as being corporate, leisure, first-visit or return-visit customers. Other businesses report no variation in marginal cost across these customer groups. The data on discounts from the rack rate, price sensitivity and costs suggest that econometric analysis of direct price discrimination in this industry is possible. Variations in return on assets and return on equity are also observed, which may allow additional econometric analysis of the data. Investigation of the characteristics of the firms in the respondent group using correlation analysis indicates some correlation values significant at the 5% level suggesting that care should be taken with the econometric analysis to avoid multicollinearity issues. The next step is to investigate the specific research questions posed in Chapter 1 by analysing the survey data using econometric methods. That analysis is contained in Chapters 6 to 8.

6 Direct price discrimination

In this chapter the survey data are used to investigate the first of the first of the specific research questions; whether firms in the short-stay accommodation industry use direct price discrimination strategies. The survey data⁸⁵ summary documented in Chapter 5 indicates that firms in the short-stay accommodation industry are capable of identifying customers as belonging to particular groups, and thus can use this information to conduct direct price discrimination. The criteria by which these groups are identified are the distribution channel the customer uses and whether the customer is a corporate, leisure, return-visit or first-visit customer. There is, therefore, an assumption that customers do not self-select as would be the case with indirect price discrimination. The summary in the previous chapter also established that firms have information about the price sensitivity and the marginal cost of supplying each of these customer groups. These findings suggest that the firms are in a position to use direct price discrimination strategies, and the purpose of this chapter is to provide a further analysis using econometric techniques.

Section 6.1 describes a model of an imperfectly competitive firm which is used to motivate the econometric analysis. Firms are able to use direct price discrimination strategies because they have some market power, arising from the fact that they produce differentiated products. The development of the estimating equation based on the theoretical model is set out in Section 6.2. The transformation of the survey data used in the estimation is described in Section 6.3. The econometric analysis and discussion of the results is in Section 6.4.

6.1 Derivation of an equation for econometric analysis

The objective of this section is to derive an equation suitable for an econometric analysis of direct price discrimination. A model of a firm in an imperfectly competitive market is used to derive the equilibrium relationship between prices, elasticity and marginal cost. The estimating equation is motivated by this equilibrium relationship.

The starting point for the model is to define the customer group j ⁸⁶ demand function for firm i as follows.

$$q_j = f_{i,j}(p_j^i + \phi \bar{P}_j, \mathbf{X}_1) \quad 6-1$$

⁸⁵ Survey data refers to the data from the pilot survey and survey from here on.

⁸⁶ Where j could be a distribution channel, corporate, leisure, first-visit or return visit group.

where q_j units (guest nights) is consumed by group j customers, the price paid by group j customers is p_j , and \mathbf{X}_1 is a vector of variables that incorporates all the non-price factors that affect demand. The average industry price in Tasmania over guest nights for group j is \bar{P}_j . The assumption is made that no firm is large enough to materially affect the industry price when that operator changes their own price. This condition is shown below in equation 6-2.

$$\frac{\partial \bar{P}_j}{\partial p_j^i} \approx 0 \quad 6-2$$

The firm specific parameter φ in equation 6-1 measures the extent to which the average industry price influences firm i 's demand. The parameter φ is considered a measure of competitiveness with $\varphi = 0$ meaning there is no relationship between the industry price and firm i 's demand. The degree of competition that a firm faces depends on the substitutability of their accommodation with respect to other accommodation in the industry. This substitutability depends on customers' preferences and the degree of product differentiation for firm i . The market power for a firm in this industry therefore depends on the product differentiation between their accommodation and the accommodation in the rest of the industry. If $\varphi < 0$, then an increase in \bar{P}_j leads to a decrease in q_j . This decrease would suggest that the other accommodation in the industry is a complement to the accommodation of firm i . For example if customers in New South Wales observe an increase in \bar{P}_j they purchase less accommodation in Tasmania including the accommodation at firm i . The assumption is that visitors to Tasmania purchase a holiday which may involve staying at a number of accommodation firms. If the average industry price in Tasmania increases visitors are assumed to shorten their holiday across all firms rather than switch between firms.

If $\varphi > 0$ then an increase in \bar{P}_j leads to an increase in q_j . This increase suggests that the other accommodation in the industry is a substitute for the accommodation of firm i . If customers observe an increase in \bar{P}_j they purchase accommodation with firm i rather than accommodation with firms in the rest of the industry. Firm i therefore faces a residual demand curve which is a function of the average industry price \bar{P}_j . The specification in

equation 6-1 is based on that of Carlton and Perloff (2005, 205) where the demand curve facing the firm is a function of the prices of each rival product.⁸⁷

The profit relationship for a firm with two customer groups, j and k , is as follows:

$$\begin{aligned}\Pi_{j,k}^i = & p_j [1 - \gamma_j] f_{i,j} (p_j + \phi \bar{P}_j, \mathbf{X}_1) - c_j (\mathbf{X}_2) f_{i,j} (p_j + \phi \bar{P}_j, \mathbf{X}_1) \\ & + p_k [1 - \gamma_k] f_{i,k} (p_k + \phi \bar{P}_k, \mathbf{X}_1) - c_j (\mathbf{X}_2) f_{i,k} (p_k + \phi \bar{P}_k, \mathbf{X}_1)\end{aligned}\quad 6-3$$

- Fixed Costs

In equation 6-3, Π denotes profit of firm i . The price paid by group j is p_j and by group k is p_k and denotes the pre-commission price. These prices are adjusted for the rate of commission γ_j to reflect the revenue that the firm receives. The post-commission prices are $p_j(1 - \gamma_j)$ and $p_k(1 - \gamma_k)$. The marginal cost of supplying customer group j is $c_j(\mathbf{X}_2)$ and for customer group k is $c_k(\mathbf{X}_2)$, where \mathbf{X}_2 is a vector of variables that affect marginal cost. The first-order condition for group j is

$$\begin{aligned}& p_j [1 - \gamma_j] \frac{\partial f_{i,j} (p_j + \phi \bar{P}_j, \mathbf{X}_1)}{\partial p_j} + [1 - \gamma_j] f_{i,j} (p_j + \phi \bar{P}_j, \mathbf{X}_1) \\ & = c_j (\mathbf{X}_2) \frac{\partial f_{i,j} (p_j + \phi \bar{P}_j, \mathbf{X}_1)}{\partial p_j}\end{aligned}\quad 6-4$$

where $\partial f_{i,j} < 0$

from which the Lerner index, which is written in terms of post-commission prices, can be found

$$p_j [1 - \gamma_j] = \frac{c_j (\mathbf{X}_2)}{1 - \frac{1}{e_j(p_j, \phi, \mathbf{X}_1)}}\quad 6-5$$

where

$$e_j(p_j, \phi, \mathbf{X}_1) = \frac{p_j \frac{\partial f_{i,j} (p_j + \phi \bar{P}_j, \mathbf{X}_1)}{\partial p_j}}{f_{i,j} (p_j + \phi \bar{P}_j, \mathbf{X}_1)}\quad 6-6$$

⁸⁷ The specification in Equation 6.1 differs from that of Carlton and Perloff (2005, p205) since it implies there is little substitutability between individual firms but considerable substitutability between firm i and the rest of the industry.

There is no term in these three equations that accounts for the impact on customer group j of changing p_k . There is no cross price affect, because it is assumed that customers cannot substitute across groups. For example, a leisure customer cannot purchase a guest night intended for a corporate customer and a first visit customer cannot purchase a guest night intended for a return visit customer. In the case of substitution across distribution channels there is an assumption that this there is minimal substitution at the margins with few customers self-selecting. As noted in Section 3.1 the firm may be able to identify characteristics of customers who prefer particular distribution channels. If they can do this and making the strong assumption of little substitution across distribution channels then this is direct price discrimination.

The Lerner index shows that the profit-maximizing post-commission price is a function of the elasticity of demand and marginal cost. For a given customer group a greater (smaller) post-commission price is associated with a smaller (greater) elasticity of demand. For example if corporate customers are more sensitive to price than leisure customers then equation 6-5 predicts that corporate customers will pay a lesser post-commission price than leisure customers. The equation also predicts that an increase in marginal cost generates an increase in the post-commission price.

6.2 Development of the estimating equation

In this section the estimating equation is developed. The estimating equation is based on the Lerner index given in equation 6-5. Recall from Section 5.2.5 that the marginal cost data collected in the survey are framed in relative terms. This framing means that there are no absolute values of marginal cost that can be used in the estimation of equation 6-5, and so our estimating equation is based on the ratio of the Lerner index for two customer groups, as shown in equation 6-7 (the \mathbf{X}_2 vector of variables is omitted because it is common across groups). The specification in equation 6-7 uses the ratio of prices as did Busse and Rysman (2005) and Verboven (2002) in their studies.

$$\frac{p_j(1-\gamma_j)}{p_k(1-\gamma_k)} = \frac{c_j}{c_k} \left(\frac{1 - \frac{1}{e_k}}{1 - \frac{1}{e_j}} \right) \quad 6-7$$

where the arguments of e_k have been suppressed for expositional simplicity. Equation 6-7 can be written in log-linear form for estimation purposes. The transformed equation is shown below.

$$\begin{aligned} \{\ln p_j + \ln(1 - \gamma_j)\} - \{\ln p_k + \ln(1 - \gamma_k)\} = \\ \{\ln c_j(\mathbf{X}_2) - \ln c_k(\mathbf{X}_2)\} + \left(\ln\left(1 - \frac{1}{e_k}\right) - \ln\left(1 - \frac{1}{e_j}\right) \right) \end{aligned} \quad 6-8$$

The third modification addresses the fact that the data for the marginal cost and elasticity variables from the survey are discrete ordered data. Including two ordered variables as independent variables in the estimation of equation 6-8 involves specifying each of the ordered responses as dummy variables. This specification generates eight dummy variables.⁸⁸ Specifying the responses as dummy variables also means that the ordering of the responses disappears. While it is desirable to retain the ordering of the marginal cost and elasticity variables for the purposes of the estimation it is not possible to retain the ordering for both of these variables. Given the hypothesis under consideration the elasticity variable is selected as the dependent variable. This allows for the testing of the relationship between the post commission price and elasticity whilst controlling for marginal cost. Equation 6-8 is therefore inverted so that the difference in elasticity variable is the dependent variable. This is shown below.

$$d_k - d_j = -(s_k - s_j) + (t_k - t_j) \quad 6-9$$

where

$$d_k = \ln\left(1 - \frac{1}{e_k}\right), s_k = \{\ln p_k + \ln(1 - \gamma_k)\} \text{ and } t_k = \ln c_k(\mathbf{X}_2)$$

Note that d_k is a monotonic transformation of e_k , and is the variable used in the estimation.

The equation to be estimated is set out below where the β 's are the coefficients to be estimated and ε_{jk} is the error term where the errors are assumed to be distributed normally with a mean of zero and variance of 1.

$$d_k - d_j = \beta_1(s_k - s_j) + \beta_2(t_k - t_j) + \varepsilon_{jk} \quad 6-10$$

⁸⁸ Two of these dummy variables would be dropped for estimation purposes

Were continuous variables on marginal cost and elasticity to be available, evidence of direct price discrimination using equation 6-10 would require that $\beta_1 = -1$ and $\beta_2 = 1$. This follows directly from equations 6-7 and 6-9. The first condition means that an increase (decrease) in the logarithm of the difference in post-commission prices generates an equal decrease (increase) in the logarithm of the difference in elasticity. The direct price discrimination hypothesis predicts that if p_k increases relative to p_j then $s_k - s_j$ increases and $d_k - d_j$ will decrease. The second condition means that an increase (decrease) in the logarithm of the difference in marginal cost generates an equal increase (decrease) in the logarithm of the difference in elasticity. The direct price discrimination hypothesis predicts that if c_k increases relative to c_j then $t_k - t_j$ increases and $d_k - d_j$ will increase. The change in $d_k - d_j$ arising from a change in the ratio of prices or ratio of marginal costs could arise from e_j becoming more (less) negative than e_k or from e_k becoming less (more) negative than e_j .

With discrete variables used in the estimation, the equation 6-10 does not predict the exact values of the coefficients β_1 and β_2 . However the above argument suggests that theory would predict that the estimated coefficients take values such that $\beta_1 < 0$ and $\beta_2 > 0$. The dependent variable in equation 6-10 is an ordered variable and can be estimated using the ordered probit model.⁸⁹⁹⁰

6.3 Generation and description of the variables for estimation

The variables in equation 6-10 are the difference in the logarithms of post-commission prices, the difference in elasticity variable and the difference in marginal cost variable. The next step in the analysis is to construct these variables using data from the survey, the rack rate data and rates of commission data. The survey data used for the variables are contained in the responses to Questions 14 to 19 (difference in the logarithm of post-commission prices), Questions 20 to 25 (difference in elasticity) and Questions 26 to 34 (difference in marginal cost). The price data are continuous data, the elasticity and marginal cost data are ordered data sets. The price data are constructed using the data from Questions 14 to 19 on discounts from the rack rate in conjunction with the rack rate and commission data. Since the rack rate

⁸⁹ W. Greene (2003) and J. Freese and S. Long (2005) provide expositions of the ordered probit model.

⁹⁰ The data used for the estimation is an unbalanced panel. The firms were asked the same questions in winter and summer periods but firms did not answer all the questions. There was insufficient data to use the random effects ordered probit model.

is the same across each of the direct price discrimination groups then the rack rate cancels and the discounts and rate of commission determine the difference in prices. Data are available for the four distribution channel groups which are the wholesalers, retailers, web and door groups.⁹¹ Data are also available for the corporate, leisure, return-visit and first-visit customer groups. These eight groups are those observed by firms that could be potentially used for direct price discrimination purposes.

The data for the difference in marginal cost variable are framed in relative terms. The base groups for this variable were selected in the process of designing the questionnaire to enable firms to effectively respond to the marginal cost questions. The base group for the distribution channel customer groups is the door channel. Using the door as the base group for the distribution channels generates wholesaler relative to door, retailer relative to door and web relative to door. The base group for corporate and leisure customer group is the leisure group. The base group for the return-visit and first-visit customer group is the first-visit group. The same three base groups are used in the construction of the difference in the logarithm of post-commission prices and difference in elasticities variables.⁹² The constructions generate five sets of variables. These five sets of variables are pooled to generate the difference in the logarithm of post-commission prices variable, the difference in elasticity variable and the difference in marginal cost variable. The five sets of variables are first described to assess whether there is sufficient variation in the data to test the hypothesis of direct price discrimination.

6.3.1 Difference in post-commission prices variable

The data used for the logarithm of post-commission prices variable are summarised in Table 6.1. This summary provides an indication of the extent of variation in post-commission prices between the base groups and the selected groups. The selected groups are the wholesaler, retailer, web, corporate and return-visit groups. The base groups are the door, leisure and first-visit groups. Variation in the post-commission price across the groups indicates that the firm is using direct price discrimination strategies if these post-commission prices do not reflect variations in marginal cost. No variation in the post-commission price could also

⁹¹ The descriptions of the four distribution channel groups are simplified for the purposes of the analysis in this chapter and Chapters 7 and 8.

⁹² The calculation of the difference in post-commission prices, difference in elasticities and difference in marginal cost variables is described in detail in Appendix 9.

indicate the firm is using direct price discrimination strategies if marginal cost varies across customer groups.

Table 6.1 Mean percentage difference in post-commission prices relative to the base group

	Quarter	Mean percentage difference in post-commission price relative to base group	
wholesalers	summer	-26.8	*
	winter	-14.1	*
retailers	summer	-12.6	*
	winter	0.6	
web	summer	-3.3	*
	winter	-2.6	*
corporate	summer	-7.1	*
	winter	-0.5	
return	summer	-1.4	*
	winter	-0.4	

* indicates the percentage is significantly different from zero at the 10% level using a student t test

Table 6.1 shows there is variation in post-commission prices across the customer groups. In the summer, post-commission prices for the wholesaler, retailer and web channels are significantly lower than for the door. In the winter post-commission prices for the wholesaler and web channel are significantly lower than the door and for the retailer not significantly different than the door. In the summer corporate post-commission prices are significantly lower than leisure post-commission prices, but not significantly different in winter. Return-visit post-commission prices are significantly different to first-visit post-commission prices in summer but not in winter. If the variations in post-commission prices observed in Table 6.1 do not reflect variation in marginal costs, then the data in Table 6.1 indicate that the firms could be using direct price discrimination strategies. Even in the case of no significant variation in post-commission price, for example with the retailer post-commission price relative to the door post-commission price in winter, there could be direct price discrimination if there is some variation in marginal cost.

6.3.2 Difference in elasticity variable

The data for the difference in elasticity variable are summarised in Table 6.2. The base groups used in the construction of this variable are the same as those in the previous section. The base groups are therefore the door, leisure and first-visit groups. The selected groups are the wholesaler, retailer, web, corporate and leisure groups. The difference in elasticity variable is an ordered variable constructed from the responses to questions 20 to 25. There are 5 points in the ordering of this constructed variable and these are labelled *d1diffelast* to *d5diffelast*.⁹³ The rows in Table 6.2 represent the proportion of respondents giving each of the responses, such that the percentages sum to 100 across the row. A response of *d4diffelast* (*d5diffelast*) indicates that the selected group is more elastic (even more elastic) than the base group. A response of *d2diffelast* (*d1diffelast*) indicates that the selected group is less elastic (even less elastic) than the base group. A response of *d3diffelast* indicates that the elasticity for the selected group is the same as for the base group.

⁹³ The construction of the difference in elasticities variable is described in more detail in Appendix 9.

Table 6.2 Percentage of responses for the difference in elasticity variable

	Quarter	<i>d1diffelast</i>	<i>d2diffelast</i>	<i>d3diffelast</i>	<i>d4diffelast</i>	<i>d5diffelast</i>
wholesalers	summer	5	14	53	28	0
	winter	2	7	78	12	0
retailers	summer	5	5	60	26	5
	winter	2	7	74	14	2
web	summer	0	10	77	10	2
	winter	11	80	7	2	0
corporate	summer	0	14	55	24	7
	winter	0	28	58	13	3
return	summer	2	4	75	15	4
	winter	2	11	77	9	2

The summary in Table 6.2 provides an indication of the variation in the elasticity between the selected groups and the base groups. There is variation between the elasticities of the selected groups and base groups, for example 24% of respondents indicated that the elasticity of the corporate customer group is more elastic than the leisure customer group. The variation in elasticities across customer groups may allow firms to use direct price discrimination strategies. If there are differences in elasticity across customer groups the firm may be able to offer different prices for these groups. The variations in elasticity across groups observed in Table 6.2 and the variations in post-commission prices observed in Table 6.1 can be used to estimate equation 6-10 and test whether β_1 is significantly less than zero.

6.3.3 Difference in marginal cost variable

The data for the difference in marginal cost variable are summarised in Table 6.3. The difference in marginal cost variable is constructed from the responses to Questions 26 to 34. The base groups used in the construction of this variable are the same as those used to construct the difference in post-commission prices and difference in elasticity variables described in Section 6.3.1 and 6.3.2. The base groups are therefore the door, leisure and first-visit groups. The selected groups are the wholesaler, retailer, web, corporate and leisure groups. The difference in marginal cost variable is an ordered variable. There are 5 points in the ordering of this constructed variable and these are labelled *d1diffmargcost* to *d5diffmargcost*.⁹⁴ As with Table 6.2 the rows in Table 6.3 represent the proportion of respondents giving each of the responses, such that the percentages sum to 100 across the row. A response of *d4diffmargcost* (*d5diffmargcost*) indicates the marginal cost of a guest night for the selected group is higher (even higher) than for the base group. A response of *d2diffmargcost* (*d1diffmargcost*) indicates that the marginal cost of a guest night for the selected group is lower (even lower) than for the base group. A response of *d3diffmargcost* indicates that the marginal cost for the selected group is the same as for the base group.

⁹⁴ The construction of the difference in marginal cost variable is described in more detail in Appendix 9.

Table 6.3 Percentage of responses for the difference in marginal cost variable

	Quarter	<i>d1diffmargcost</i>	<i>d2diffmargcost</i>	<i>d3diffmargcost</i>	<i>d4diffmargcost</i>	<i>d5diffmargcost</i>
wholesalers	summer	4	2	62	4	29
	winter	2	2	69	8	19
retailers	summer	4	2	65	14	16
	winter	2	2	69	13	15
web	summer	0	4	73	20	4
	winter	0	4	81	13	2
corporate	summer	9	20	70	0	0
	winter	7	20	69	4	0
return	summer	4	16	73	6	2
	winter	8	13	73	6	0

The summary in Table 6.3 provides an indication of the variation in marginal costs between the selected groups and the base groups. Marginal costs vary across the customer groups, for example 16% of respondents state that marginal cost is lower for the return visit customer group than the first-visit customer group in the summer. As noted in Section 6.3.1, when variations in post-commission prices reflect variations in marginal costs across the customer groups there is no direct price discrimination. Conversely where variations in marginal costs are not reflected in post-commission prices there is direct price discrimination. It is therefore important to determine whether the variations in marginal costs across the customer groups reflect variations in post-commission prices. The difference in marginal cost variable can therefore be used in the estimation of equation 6-10 to test whether β_2 is significantly greater than zero.

6.4 Estimation and results

An ordered probit model is used to estimate equation 6-10. The variables used in the estimation are the difference in the natural logarithm of post-commission price variable denoted *lnpostcommpricediff*; the ordered difference in elasticity variable denoted *diffelast* and the dummy variables, *d1diffmargcost* to *d5diffmargcost* to represent the difference in marginal cost variable. Pooling the five sets of variables generates 207 observations for the estimation of equation 6-10.⁹⁵

The hypothesis tested in equation 6-10 concerning marginal cost predicts that $\beta_2 > 0$, where β_2 is the coefficient on the difference in marginal costs variable. Four versions of equation 6-10 are estimated to test the difference in marginal cost variable with different samples of the respondent group. The results of these four versions are shown in Table 6.4 and are labelled A to D.⁹⁶ The sample of observations used for A and B includes all firms. In C the sample of observations includes only those firms who report no variation in marginal costs between the base groups and the selected groups. In D the sample of observations includes only those firms who report a variation in marginal costs between the base groups and the selected groups.

⁹⁵ Some firms did not complete all the price, elasticity and marginal cost questions used to generate the data for the construction of these variables.

⁹⁶ The cut points are not reported in Table 6.4 but are available in Appendix 10. The cut points indicate where the latent variable is cut to make the five ordered groups in *diffelast*. All the cut points in the four versions are significant at the 1% level. The hypothesis test is whether they are significantly different from zero. The significance indicates that the data for *diffelast* are in fact ordered.

In A the difference in marginal costs variable is represented by the dummy variables, *d1diffmargcost* to *d5diffmargcost*.⁹⁷ Using a set of dummy variables means that it is not possible to retain the ordering of this variable. The coefficients on the dummy variables in version A may therefore be misspecified. None of the coefficients on *d1diffmargcost* to *d5diffmargcost* are significant in A. In order to attempt to resolve the possibility of misspecification a difference in marginal costs variable is constructed using numerical boundaries.⁹⁸ This variable is called *diffmargcost15* and is used in B. The coefficient on the *diffmargcost15* variable is insignificant but the sign of the coefficient is positive which is consistent with $\beta_2 > 0$. Sensitivity testing on the *diffmargcost15* variable using different boundary limits is carried out with little difference in the coefficient values and significance.

In versions A and B the sample of data reflects responses from the complete respondent group.⁹⁹ This means the estimations include some firms who report a difference in marginal cost between the selected group and the base group and others who do not report a difference. In Table 6.3 the data show that 70% of respondents on average reported no variation in marginal cost. It is possible that the sample of respondents who report a variation in marginal cost is too small to generate significant coefficients on either the *d1diffmargcost* to *d5diffmargcost* dummy variables or on *diffmargcost15*. The sample is therefore divided and C includes only those respondents who report no variation in marginal cost and D those who report a variation in marginal cost. The *diffmargcost15* variable is used in D because it generated a coefficient consistent with the hypothesis proposed in equation 6-10 when used in B. In D the sign of the coefficient on *diffmargcost15* is again positive but the coefficient is not significant. The econometric issues associated with the difference in marginal cost variable are discussed in Section 6.5.

⁹⁷ *d3diffmargcost* is dropped for estimation purposes.

⁹⁸ These are minus 15% for *d1diffmargcost*, minus 5% for *d2diffmargcost*, plus 5% for *d4diffmargcost* and plus 15% for *d5diffmargcost*. Creating a continuous variable avoids the issue of ordering.

⁹⁹ The number of observations are N=207, 128 and 79. These numbers represent the number of responses to the survey questions used to generate the data. There are 5 relative customer groups, 85 firms and 2 seasonal periods so the maximum number of responses would be 850. Not all respondents answered all questions so the data used in the estimations represent a sample of responses from the respondent group. Chi-squared tests of the distributions for the star rating, region and room size categories are generated for the firms responding to these questions and for the firms in the respondent group. They indicate no significant difference at the 5% level between the sample of firms responding to these questions and the respondent group. The results can therefore be used for inference purposes.

Table 6.4 Estimated coefficients for A to D versions

<u>Independent variables</u>	<u>Dependent variable</u>			
	A <i>diffelast</i>	B <i>diffelast</i>	C <i>diffelast</i>	D <i>diffelast</i>
<i>lnpostcommpricediff</i>	-0.792 (-1.43)	-0.797 (-1.50)	-1.764* (-2.35)	0.202 (0.26)
<i>d1diffmargcost</i>	-0.142 (-0.35)			
<i>d2diffmargcost</i>	-0.0634 (-0.26)			
<i>d4diffmargcost</i>	-0.123 (-0.53)			
<i>d5diffmargcost</i>	0.0443 (0.15)			
<i>diffmargcost15</i>		0.0172 (0.26)		0.0282 (0.42)
N=	207	207	128	79

z statistics in parentheses

* p<0.05 ** p<0.01 *** p<0.001

The second hypothesis tested in the estimation of equation 6-10 and reported in A to D is whether firms are using direct price discrimination strategies. This hypothesis requires $\beta_1 < 0$. The direct price discrimination hypothesis predicts that an increase in the post-commission price of group j relative to the post-commission price of group k means a decrease in the elasticity of group j relative to the elasticity of group k . In A and B the sign of β_1 is negative, but the coefficient is not significant. In D, β_1 is positive and insignificant. C is therefore the only estimate that confirms the *a priori* expectation about β_1 since the coefficient is negative and significant at the 5% level. The sign and significance of β_1 in C provide evidence of the use of direct price discrimination strategies by the group of firms who report no difference in costs between the base groups and the selected groups. The insignificant coefficient values for β_1 in A and B suggest that controlling for cost reduces the significance of the *lnpostcommpricediff* variable.

Marginal effects for the logarithm of the difference in post-commission prices are generated from the estimates in C and reported below in Table 6.5. Recall that with the dependent variable a response of *d4diffelast* (*d5diffelast*) indicates that the selected group is more elastic (even more elastic) than the base group. A response of *d2diffelast* (*d1diffelast*) indicates that the selected group is less elastic (even less elastic) than the base group. A response of *d3diffelast* indicates that the elasticity for the selected group is the same as for the base group. The marginal effects indicate that for a one unit change in the difference in the logarithm of post-commission prices, the probability of obtaining *d4diffelast* is expected to decrease by 36.6 % whereas the probability of obtaining *d2diffelast* is expected to increase by 17.5 %.¹⁰⁰ Take, for example, the situation where the post-commission price for the selected group is higher than the post-commission price for the base group. If the difference between the post-commission prices of the selected and base groups increases, the likelihood that the selected group has a lower elasticity than the base group increases.

¹⁰⁰ A one unit change in the logarithm of post-commission prices represents a 1.6% change in the post-commission prices ratio when calculated at the mean of the post commission prices ratio, where the ratio is expressed as a percentage difference.

Table 6.5 Marginal effects for C

C	Dependent variable : <i>diffelast</i>				
	<i>d1diffelast</i>	<i>d2diffelast</i>	<i>d3diffelast</i>	<i>d4diffelast</i>	<i>d5diffelast</i>
<i>lnpostcommpricediff</i>	0.141	0.175	0.184	-0.366	-0.133

6.5 Estimation issues

Two issues need discussion. The first concerns the insignificant coefficients on the difference in marginal cost variable in A, B and D. The questions used to generate the difference in marginal cost data were framed using numerical boundaries. However in the process of simplifying the responses these were converted to ordered variables with the dummy variables *d1diffmargcost* to *d5diffmargcost* representing the ordered variable in A. The creation of a numerical variable for B may have involved some loss of information on differences in marginal cost since the *d1diffmargcost* and *d5diffmargcost* categories which invited open ended responses on the questionnaire were replaced by plus and minus 15% in *diffmargcost15*. Attempting to re-introduce the numerical boundaries using the *diffmargcost15* variable does appear to correct for some of the missing information as the z value on the *lnpostcommpricediff* coefficient is slightly higher in B than in A. It would be helpful in future studies to use questions to generate actual marginal cost data to avoid such issues.

A second issue concerns the ordered probit model. In this model the regressors are assumed to be uncorrelated with the errors in the model. If this assumption fails the model is misspecified. Misspecification can occur because of simultaneity bias, omitted variables or measurement errors. Simultaneity issues may arise when the elasticity of demand is estimated using price and quantity data and identification of changes in quantity and prices has to be established. The data used in the estimation of equation 6-10 are generated from questions that firms answered concerning a particular quarter. There is no simultaneity bias as firms are asked about actual responsiveness to price changes (elasticity) and discounts from the rack rate which are then used to calculate actual prices for the same quarter. The second endogeneity issue is one of omitted variables. There are no omitted variables since the equation specified in equation 6-10 contains all the variables in equation 6-7. This latter point assumes that the goal of the firm is to profit maximise and that the demand equation is

correct. Finally, the issue of measurement error is introduced because of the need to use Likert scales in the collection of the elasticity and marginal cost data. Estimation using the ordered probit model allows for some modelling of this error.¹⁰¹

6.6 Conclusions

In this chapter an econometric model is developed based on the assumption that the short stay accommodation industry is imperfectly competitive. The model is used to test whether firms in the short-stay accommodation industry are using direct price discrimination strategies. The econometric analysis supports the hypothesis that firms who report no variation in marginal cost between customer groups are using direct price discrimination strategies. The next step in the analysis is to investigate the factors that affect the elasticity of demand. This investigation is necessary because it is differences in the elasticity of demand across customer groups, and the fact that the firm can identify and separate the groups, that allows the operator to use direct price discrimination strategies.

¹⁰¹ The unobserved latent dependent variable is a linear combination of a set of predictors plus a disturbance term that has a standard Normal distribution.

7 Elasticity of demand

In this chapter the factors that determine the elasticity of demand for short-stay accommodation in Tasmania are investigated. The Lerner index set out in the previous chapter shows the theoretical relationship between prices, marginal cost and elasticity of demand for direct price discrimination strategies. The Lerner index is used as the basis for investigating the factors that affect the elasticity of demand. The investigation does not involve estimating the relationship between price and elasticity of demand since the elasticity observed in the survey responses is the elasticity of demand in equilibrium. A two stage least squares econometric procedure is used to determine the factors that affect the elasticity of demand. The first stage involves estimating pre-commission price as a function of marginal cost. The star rating, location and size of the firm are assumed to act as proxies for marginal cost. The second stage involves estimating the factors that affect the elasticity of demand. The fitted price from stage one is used in the second stage estimation. The elasticity of demand is found to be a function the competitiveness of the industry and whether or not it is the winter or summer season. The relationship between elasticity of demand and star rating, location and size of the firm can also be inferred from the signs on the coefficients in the first stage equation and the sign of the coefficient on the fitted price variable in the second stage.

In Section 7.1 the factors that could affect the elasticity demand are identified. They are discussed in the context of the theoretical model developed in the previous chapter. In Section 7.2 the estimating equations for the investigation of these factors are developed. The data used in the analysis of the factors are described in Section 7.3. In Section 7.3 sensitivity analysis of the distribution channel data is also presented. This sensitivity analysis is necessary to enhance the results of the econometric analysis. The estimation process and results are reported in Section 7.4.

7.1 Identification of the factors that affect the elasticity of demand

The model of an imperfectly competitive firm developed in the previous chapter is the starting point for the analysis of the factors that affect the elasticity of demand. For ease in reading the model is repeated below.

$$p_j [1 - \gamma_j] = \frac{c_j(\mathbf{X}_2)}{1 - \frac{1}{e_j(p_j, \phi, \mathbf{X}_1)}} \quad 7-1$$

$$e_j(p_j, \phi, \mathbf{X}_1) = \frac{p_j \frac{\partial f_{i,j}(p_j + \phi \bar{P}_j, \mathbf{X}_1)}{\partial p_j}}{f_{i,j}(p_j + \phi \bar{P}_j, \mathbf{X}_1)} \quad 7-2$$

where $\partial f_{i,j} < 0$

Equations 7-1 and 7-2 describe the model for customer group j used by the firm for direct price discrimination purposes. Equation 7-1 is once again the familiar Lerner index. The post-commission price $p_j [1 - \gamma_j]$ in Equation 7-1 is a function of the marginal cost $c_j[\mathbf{X}_2]$ and the elasticity of demand e_j . As noted in the previous chapter \mathbf{X}_2 is a vector of four firm characteristics that affect marginal cost. These are the star rating, location, size and type of firm. It is helpful to consider how these characteristics could affect marginal cost.

First it is hypothesized that the star rating does affect the marginal cost of the firm. It is more costly to provide a guest night in a higher star rated firm than a lower star rated firm.¹⁰² Second, the location of the firm could also generate differences in marginal cost. It is hypothesized that differences in location affect the cost of transportation and inputs resulting in differences in marginal cost across the regions, for example where supplies for a guest room need to be transported from distribution centres in Hobart or Launceston. It is not clear *a priori* whether firms in the more remote areas will incur higher or lower marginal costs than those in the urban centres. The cost of transportation and inputs may be higher for the firms in the remote areas because they are further away from the ports than the firms in the urban centres. The cost of labour however, may be lower for those firms in the more remote areas than those in the urban centres because of lower competition for labour in the remote areas. Third it is hypothesized that the size and type of firm may also affect marginal cost. As a firm increases in size the firm may be able to take advantage of economies of scale that affect average cost and also marginal cost. For example as the number of rooms in the accommodation increases the cost of laundry may fall. The fourth characteristic is the type of firm. The type and size of firm variables are however highly correlated.¹⁰³ The larger firms

¹⁰² Based on information provided by firms in Stage 1 of the fieldwork.

¹⁰³ This is shown in the correlation matrix in Table 5.14 in Chapter 5

are usually hotels or motels and the smaller firms bed and breakfast or guest houses. The problems associated with collinearity could arise if both these variables are included in the estimating equation. Excluding the type of firm variable means that the size of firm variable is acting as a proxy for the type of firm variable.

The elasticity of demand in equation 7-2 is a function of the pre-commission price p_j , the average industry price \bar{P}_j and the \mathbf{X}_j vector of variables. There is no *a priori* conclusion that can be made about the relationship between p_j and e_j since this depends on the nature of the demand function. As the elasticity of demand is being observed in equilibrium it is not possible to discuss the relationship between the elasticity of demand and the price.¹⁰⁴ The elasticity of demand is observed at a point along the demand function for each of the customer groups.

The degree of competition in the industry is captured by the relationship between e_j and the average industry price \bar{P}_j . When \bar{P}_j falls holding p_j fixed, sales may be lost to competitor firms. The extent to which the firm loses sales depends on the degree of competition and the degree of substitutability between each firm and the rest of the industry. This information is contained in the parameter ϕ . Firms with few competitors and whose product is not easily substituted will be less affected by changes in \bar{P}_j than those with many competitors and whose product may be easily substituted.

As noted in the previous chapter the \mathbf{X}_j vector of variables incorporates all the non-price factors that affect demand and therefore the elasticity of demand in equation 7-2. The first of these factors relates to the nature of the seasonal demand for short-stay accommodation in Tasmania. There is a marked winter season in Tasmania.¹⁰⁵ Tasmanian winters are relatively cold so customers may seek warmer destinations. It is hypothesized that customers are more sensitive to price in the winter than the summer.

The second of the factors that affect elasticity in the \mathbf{X}_j vector of variables relates to the finding in Section 6.4. This finding is that those firms who report no change in marginal cost across customer groups use direct price discrimination strategies. These customer groups are the four distribution channel groups (wholesaler, retailer, web and door), corporate, leisure,

¹⁰⁴ It is important to emphasize that our results refer to the estimated elasticity for the firms given the prices they faced in the survey quarter.

¹⁰⁵ Based on information provided by firms in Stage 1 of the fieldwork.

first-visit and return-visit groups. Since the firms are using direct price discrimination this suggests that the elasticity of demand varies across the customer groups. If there were no differences across groups in terms of elasticity the firms would have no incentive to use direct price discrimination. The inclusion of a variable for groups therefore accommodates the finding in the previous chapter. There are various *a priori* hypotheses about how elasticity could vary across the groups. For example, corporate customers may have less elastic demand than leisure customers because they are often not paying for their booking. Alternatively return-visitors may have less elastic demand than first-visit customers since they have already experienced the accommodation and have made a decision to return. Hence it is not possible to have an *a priori* expectation for the direction of the effect on elasticity of the use of these distribution channels by customer groups for direct price discrimination purposes.

The remaining non-price factors that affect the elasticity of demand relate to the characteristics of the firm. These are the star rating, location, size and type of the firm. There are no *a priori* indications of the direction of the affects of these variables on elasticity. There will be customers who prefer bed and breakfast accommodation to hotel or motel accommodation, others who prefer higher star rated to lower star rated accommodation, others who prefer smaller to larger establishments and others who prefer urban to more remote locations. The direction of the relationship between these characteristics and the elasticity of demand will lie in the mix of idiosyncratic factors relating to the preferences of individual customers. For the firms however the effect of these characteristics on elasticity will be reflected in the availability of substitutes. Firms in the urban areas, where there are more firms, may have more substitutes for their product than those firms in the more remote areas. Similarly a 5 star rated accommodation firm may have fewer substitutes for their product and hence a lower degree of competition than a 3.5 star rated firm. The degree of substitutability for a firm therefore depends on the competitiveness of their particular market. As noted above the degree of competition is captured by the parameter φ .

The discussion of the factors affecting elasticity of demand and marginal cost determined by the theoretical relationship described in Equations 7-1 and 7-2 provides the basis for determining the equations to be estimated. This is the topic of the next section.

7.2 Development of the estimating equations

This section demonstrates how the estimating equation can be derived from the model of the imperfectly competitive firm discussed in Section 6.1.

Taking logarithms of Equation 7-1 yields the following log-linear equation.

$$\ln p_j (1 - \gamma_j) = \ln c_j (\mathbf{X}_2) - \ln \left(1 - \frac{1}{e_j(p_j, \phi, \mathbf{X}_1)} \right) \quad 7-3$$

Where, as in Chapter 6, $d_j(p_j, \phi, \mathbf{X}_1) = \ln \left(1 - \frac{1}{e_j(p_j, \phi, \mathbf{X}_1)} \right)$

and where $\left(1 - \frac{1}{e_j} \right) < 1$ or $d_j > 0$ for a profit maximising business

Equation 7-3 is then modified to accommodate the ordered elasticity data. The modified equation is shown below where a weight α_1 is attached to the elasticity variable.

$$\ln p_j (1 - \gamma_j) = \ln c_j (\mathbf{X}_2) + \alpha_1 d_j \quad 7-4$$

Assume that equation 6-6 can be represented in log-linear form by equation 7-5.¹⁰⁶

$$d_j(p_j, \phi, \mathbf{X}_1) = \eta_1 (\ln p_j) + \eta_2 (\overline{\phi P_j}) + \eta_3 \mathbf{X}_1 \quad 7-5$$

The price variable p_j and elasticity of demand variable d_j appear in both equations 7-4 and 7-5 which means that these variables are endogenous. The estimation of equations 7-4 and 7-5, using OLS and Ordered Probit models, will be misspecified because of this endogeneity. In order to deal with this endogeneity a reduced form equation is derived for the price variable $\ln p_j$. This is shown below.¹⁰⁷

$$\begin{aligned} \ln p_j = & \left(\frac{1}{1 - \alpha_1 \eta_1} \right) \ln c_j (\mathbf{X}_2) + \left(\frac{\alpha_1 \eta_2}{1 - \alpha_1 \eta_1} \right) (\overline{\phi P_j}) \\ & + \left(\frac{\alpha_1 \eta_3}{1 - \alpha_1 \eta_1} \right) \mathbf{X}_1 - \left(\frac{1}{1 - \alpha_1 \eta_1} \right) \ln (1 - \gamma_j) \end{aligned} \quad 7-6$$

¹⁰⁶ Note that d_k is a monotonic transformation of e_k .

¹⁰⁷ The derivation of equation 7-6 is shown in Appendix 11.

Equation 7-6 says that the pre-commission price for any group is a function of the marginal cost, the degree of competition, the non-price factors that affect demand and the rate of commission.

The endogeneity of p_j can be corrected for by first estimating equation 7-6 and using the fitted values for $\ln p_j$ to estimate equation 7-5. The two stage procedure means that the variation in elasticity attributable to variations in the degree of competition and variations in the non-price factors that affect demand can be estimated in the second stage equation. Note that if the coefficients on $\overline{\phi P_j}$ and the \mathbf{X}_1 vector of variables are significant in the first stage equation including these variables in the second stage estimation could lead to misspecification. The misspecification arises because the fitted price is linearly correlated with those variables that are significant in the first stage. Caution should then be taken with interpreting the coefficients on the $\overline{\phi P_j}$ and the \mathbf{X}_1 vector of variables in the second stage.

The estimating equations for 7-6 and 7-5 are shown below where the β 's are the parameters to be estimated and u_j , ε_j the error terms. The error terms are assumed to be distributed normally with a mean of zero and variance of 1.

$$\ln p_j = \beta_1 \ln c_j (\mathbf{X}_2) + \beta_2 (\overline{\phi P_j}) + \beta_3 (\mathbf{X}_1) + \beta_4 \ln(1 - \gamma_j) + u_j \quad 7-7$$

$$d_j = \beta_5 (\ln \hat{p}_j) + \beta_6 (\mathbf{X}_1) + \varepsilon_j \quad 7-8$$

Equation 7-7 is estimated using ordinary least squares and equation 7-8 using an ordered probit model.

7.3 Data description

The estimation of equations 7-7 and 7-8 requires data for the following variables $\ln p_j$, d_j , \mathbf{X}_2 , $\overline{\phi P_j}$, \mathbf{X}_1 and γ_j .

The data for the $\ln p_j$ and d_j variables are obtained from the survey (Questions 14 to 19 and Questions 20 to 25) for the eight customer groups. These groups are the four distribution channels a customer uses and whether they are corporate, leisure, return-visit or first-visit

customers. The price and elasticity data for the eight customer groups cannot however be pooled for the estimation of Equation 7-7 and 7-8 because it is not possible to link the price and elasticity data for the distribution channel groups with the price and elasticity data for the corporate, leisure, return-visit and first-visit groups. For example, a guest night identified as being sold through the wholesaler channel would also be either a corporate or leisure night and also either a first-visit or return-visit night. The survey data do not allow such cross identification.¹⁰⁸ Fewer respondents answered the questions relating to the corporate, leisure, first-visit or return-visit night customer groups than the distribution channel groups. There are therefore insufficient data to generate separate estimates of equations 7-7 and 7-8 for the corporate, leisure, return-visit and first-visit groups. The estimation of equations 7-7 and 7-8 is therefore restricted to the distribution channel groups.

The price variable generated for $\ln p_j$ is called *lnprice*.¹⁰⁹ The mean pre-commission price of a guest night is \$57.26, with a standard deviation of \$44.37 and a maximum price of \$212.5. The elasticity variable generated for d_j is called *elasticity*.

A measure of marginal cost is required for the estimation of equation 7-7. The marginal costs are those costs that are incurred if a room is booked for the night rather than being empty. These are costs such as room cleaning, linen, room provisions and credit card charges. The marginal costs data from the survey are framed in relative terms, and so no absolute values of marginal cost are available from the survey data for the four distribution channels. It is hypothesized, as noted in Section 7.2, that variations in marginal cost arise from variations in the star rating, location, size and type of firm. These factors are represented by the vector of variables \mathbf{X}_2 .

As the type and size of firms are correlated only one of these variables can be used to proxy marginal cost. A continuous variable is included in the \mathbf{X}_2 vector to represent the size of the firm. Excluding the type variable means that the size variable is acting as a proxy for the type of firm. The size variable is called *noofrooms*. To control for differences in marginal cost across the firms, dummy variables for the remaining two variables - regions and the star rating categories - are created. Using region dummy variables in this way is similar to the

¹⁰⁸ Discussions with firms in Stage 1 of the field work established that it would not be possible to ask about such cross identification.

¹⁰⁹ The data set used for the pre-commission price is the same as that used in the construction of the post-commission price for the analysis in Chapter 6 and detailed in Appendix 9. The elasticity data are taken directly from the questionnaire.

approach taken by Nevo (2001) who uses an instrumental variables model to separate what he calls exogenous variation in prices (due to differences in marginal costs) from so-called endogenous variation (due to differences in unobserved valuation). The region dummy variables are called *derwent*, *devonport*, *launceston*, *sthelens*, *stanley*, *tasman* and *hobart*.¹¹⁰ The star rating dummy variables are called *2.5star*, *3star*, *3.5star*, *4star*, *4.5star*, *5star* and *unrated*.

Equation 7-7 requires data for $\overline{\phi P_j}$, the \mathbf{X}_1 vector of variables and γ_j . Data for the $\overline{\phi P_j}$ variable are based on the competitiveness question in the survey (Question 41). Responses are simplified to avoid having 5 dummy variables for this variable. The dummy takes a value of 1 for the first two responses to the question (very competitive and competitive) and a value of 0 for the three remaining responses to the question (neutral, not very competitive and not competitive at all). The dummy variable measuring competitiveness is denoted as *competition*.

The vector of variables \mathbf{X}_1 refers to the characteristics of the firm that affect the elasticity of demand. The first set of characteristics relate to the star rating, location, size and type of the firm. Star rating and region dummy variables and a size of firm variable are already being used to control for variations in marginal costs. The size of firm variable is acting as a proxy for type of firm. These firm characteristics variables are therefore explaining variations in marginal cost and also variations in elasticity of demand. It is not possible to separate the two effects of these variables in the estimation of equation 7-7. These variables are therefore not carried forward to the second stage as there is likely to be correlation between them and the fitted price variable.

The second set of characteristics of the firm in the \mathbf{X}_1 vector of variables, relate to the seasonal demand in Tasmania and the distribution channels. A dummy variable is generated to account for the seasonal effect called *winter*.¹¹¹ The dummy captures the possibility of more elastic demand over the winter and less elastic demand over the summer. The last of the variables in the \mathbf{X}_1 vector are those required for the four distribution channels. Because commission varies systematically across these channels and is therefore correlated with the γ_j variable it is not possible to use dummy variables for each of the four distribution channels. There is no commission paid on door sales so there is no correlation between the

¹¹⁰The 7 regions are consistent with the regions in Table 5.14 and are described in Appendix 8.

¹¹¹This variable takes a value of 1 in winter and 0 otherwise.

rate of commission and this variable. The distribution channel data are therefore aggregated by combining the wholesaler, retailer, and web channels and including only the *door* variable in the estimation of equation 7-7.¹¹² Finally the variable for $\ln(1-\gamma_j)$ is denoted *lncommission*.

7.4 Estimation and results

Before proceeding to the final estimates of equations 7-7 and 7-8 sensitivity testing of the *elasticity* variable is carried out. This sensitivity testing is motivated by the possibility that there may be differences in the way that firms rank elasticity. For example, one firm may judge the door channel to be elastic and another firm judge it to be inelastic but they are still able to rank the elasticity of the other channels relative to this base level. By setting the elasticity value from the door in the summer as the base value for all firms a consistent ranking of elasticities can be generated. A new ordered variable called *elasticityorder* is therefore generated with the door elasticity value in the summer used as the base in the re-ordering.¹¹³ For each firm the elasticity responses for the wholesaler, retailer and web channels are re-based relative to the door elasticity response in the summer. The sensitivity testing suggests that firms are using different frames of reference for their estimation of changes in revenue arising from changes in price. This result should be noted for future research so that questions on elasticity framed using revenue changes allow for such variations in the judgments of the respondents.

The next step is to estimate the two stage least squares model described in equations 7-7 and 7-8. The results of the estimation are reported in Table 7.1.¹¹⁴ The results of the first stage of the two stage least squares model are reported in A.¹¹⁵ The results of the second stage of the model are reported in B. The fitted variable $\ln \hat{p}_j$ is called *lnpricehat* in B.¹¹⁶

¹¹² The variable takes a value of 1 for the door channel and 0 otherwise.

¹¹³ The constructed *elasticityorder* variable generates 6 points on an ordered scale where Outcome 6 represents more elastic demand than Outcome 1. Details of the construction are in Appendix 9.

¹¹⁴ The cut points are not reported in Table 7.1 but are available in Appendix 10.

¹¹⁵ The dummy variables that are dropped in A are *4star* and *hobart*.

¹¹⁶ The number of observations is N=186. This number represents the number of responses to the questions about distribution channels. There are 2 distribution channel groups (simplified to door or not door), 85 firms and 2 seasonal periods (winter and summer quarter) so the maximum possible number of responses would be 340 responses. Not all respondents answered all questions so the data used in the estimations represent a sample of responses from the respondent group. Chi-squared tests of the distributions for the star rating, region and room size categories are generated for the firms responding to these questions and for the firms in the respondent group. They indicate no significant difference at the 5% level between the sample of firms

Table 7.1 Estimated coefficients for the two stage least squares model

A		B	
<u>Dependent variable</u>	<i>lnprecommprice</i>	<u>Dependent variable</u>	<i>elasticityorder</i>
<i>2.5 star</i>	0.0324 (0.21)	<i>lnpricehat</i>	-0.306 (-1.93)
<i>3 star</i>	-1.036*** (-7.44)	<i>competition</i>	0.479* (2.42)
<i>3.5 star</i>	-0.205* (-2.38)	<i>winter</i>	0.575*** (3.48)
<i>4.5 star</i>	0.715*** (7.87)	<i>door</i>	-0.073 (-0.39)
<i>5 star</i>	1.088*** (8.89)		
<i>unrated</i>	-0.493*** (-5.77)		
<i>derwent</i>	0.303*** (3.51)		
<i>devonport</i>	-0.300** (-3.10)		
<i>launceston</i>	-0.510*** (-5.01)		
<i>sthelens</i>	-0.273* (-2.27)		
<i>stanley</i>	-0.347*** (-4.38)		
<i>tasman</i>	-0.331** (-3.13)		
<i>noofrooms</i>	-0.00149 (-1.86)		
<i>competition</i>	-0.349*** (-4.97)		
<i>winter</i>	-0.0886 (-1.86)		
<i>door</i>	-0.0157 (-0.24)		
<i>commission</i>	-0.0187 (-0.08)		
<i>constant</i>	4.440*** (41.33)		
	N=186		N=186

z statistics in parentheses

* p<0.05 ** p<0.01 *** p<0.001

responding to these questions and the respondent group. The results can therefore be used for inference purposes.

The *3star*, *4.5star*, *5star* and *unrated* variables in A are all significant at the 0.1% level. The *3.5star* variable is significant at the 1% level and the *2.5star* variable is not significant. The coefficients on the *3star* and *3.5star* variables are negative. These results indicate that prices are lower in 3 star and 3.5 star firms than in the 4 star firms. The coefficients on the *4.5star* and *5star* variables are positive. These results indicate that prices are higher in the 4.5 star and 5 star firms than in the 4 star firms. The coefficient on the *unrated* variable is negative. This result indicates that unrated firms have lower prices than 4 star firms. The signs and coefficients on the star rating variables that are significant are all consistent with the hypothesis that the star rating price is higher because the marginal cost of providing higher star rated accommodation is higher than that for lower star rated accommodation.

All of the location variables are significant in A. The *derwent*, *launceston* and *stanley* variables are significant at the 0.1% level. The *devonport* and *tasman* variables are significant at the 1% level. The *sthelens* variable is significant at the 5% level. The coefficients on *launceston*, *devonport*, *stanley* and *tasman* are all negative. The coefficient on the *derwent* variable is positive. The Derwent region is an area north of Hobart, which could be considered a northern extension of the Hobart region. The results in A for the location variables indicates that prices farther away from the Hobart and Derwent regions are lower than in the Hobart and Derwent regions. This result is consistent with the hypothesis proposed that the location of the firm will affect prices because of differences in marginal cost across the regions.

The *noofrooms* variable is not significant in A suggesting that prices do not vary systematically with the size of the firm. The *competition* variable is significant at the 1% level in A and the sign of the coefficient is negative. This result suggests that prices are lower where the firm deems the market to be more competitive. The *winter* variable is not significant in A. Correlation tests of the *lnpricehat* variable and the other explanatory variables in the stage two equation are first generated and there are no significant correlations at the 5% level. This result means that there should be no multicollinearity issues in the estimation of the second stage equation.

The results of the second stage estimation are reported in B. The *competition* variable is significant at the 5% level and the *winter* variable significant at the 1% level. For each of these variables the sign of the coefficients suggests that elasticity will be higher when there is more competition and in the winter. The results for the *competition* and *winter* variables

support the *a priori* hypotheses about these variables. The *door* variable is not significant in B.

The effect of the star rating and region variables on elasticity can be estimated by considering the combined effect of the sign of the coefficients on these variables in estimate A and the sign on the fitted price variable in B. There is some evidence that elasticity of demand falls as the star rating increases or where the firm is located in an urban region. However because the star rating and region may affect marginal cost and demand it is not possible to definitely ascertain how these characteristics of the firm affect elasticity.

The marginal effects for the *competition* and *winter* variables in B are reported in Table 7.2.¹¹⁷ The effect on the *elasticityorder* variable represents the binary change in the *competition* and *winter* variables. For example, when a firm faces a more competitive market the probability of obtaining Outcome 1 decreases by 4.1% and the probability of obtaining Outcome 6 increases by 2.8%.

Table 7.2 Marginal effects for competition and winter variables in B

B	Dependent variable : <i>elasticityorder</i>		
	Pr (Outcome 1)	Pr (Outcome 2)	Pr (Outcome 3)
<i>competition</i>	-0.041	-0.071	-0.036
<i>winter</i>	-0.037	-0.076	-0.082
	Pr (Outcome 4)	Pr (Outcome 5)	Pr (Outcome 6)
<i>competition</i>	0.081	0.040	0.028
<i>winter</i>	0.095	0.055	0.045

7.5 Conclusions

In this chapter a two stage least squares model was used to determine the factors that affect the elasticity of demand. Two equations were specified based on the imperfectly competitive model developed in Chapter 6. A reduced form equation was developed to estimate the relationship between pre-commission price and the determinants of that price. The estimation of the reduced form equation is the first stage of a two stage least squares model. Significant

¹¹⁷ Outcome 6 represents more elastic demand than Outcome 1.

coefficients are generated for five of the six star rating categories and for all the regions. The *competition* variable is found to have a significant negative coefficient in the first stage equation which is consistent with the a priori hypothesis about this variable. The fitted price from the reduced form equation is then used in the second stage of the analysis where the relationship between elasticity, fitted price, competition, the season and the proportion of sales at the door is modelled. Significant and positive coefficients are estimated for the *competition* and *winter* variables which are consistent with the a priori hypotheses for these variables.

8 Profitability analysis

The profitability of firms in the short-stay accommodation industry is investigated in this chapter. The theoretical model developed in Chapter 6 provides the basis for identifying the factors that affect profitability. A reduced form equation is specified that models profit as a function of the proportion of sales the firm makes at the door; whether the firm uses the site Wotif.com; the characteristics of the firm, seasonal effects and lifestyle decisions by firms. Data from the survey are used to test the impact of these factors on profitability. An important finding of this analysis is that firms who utilise Wotif.com as a sales tool have significantly higher profitability than those that do not. A hypothesis is presented to explain why some firms opt to use Wotif.com and others do not. The hypothesis is based on the costs of adoption of Wotif.com. Support for this hypothesis is found.

The model and a discussion of the factors that affect profitability based on this model are presented in Section 8.1. In Section 8.2 the reduced form equation used in the estimation of the factors that affect profitability is determined. Section 8.3 contains the results of the econometric estimation and a discussion of these results. Section 8.4 contains the analysis of the effect of Wotif.com on profitability.

8.1 The factors that affect profitability and the development of the estimating equation

The model of the firm developed in Chapter 6 is used to motivate an econometric equation that will be used to estimate the impact of the factors that affect the profitability of firms in the short-stay accommodation industry. Utilising the demand function in equation 6-1, the profit of firm i , Π_i , is given by;

$$\Pi_i = \sum_{j=1}^N \Pi_{ij} \quad 8-1$$

where

$$\Pi_{ij} = (p_j(1 - \gamma_j) - C_j(\mathbf{X}_3)) \left(q_j \left(p_j + \overline{\phi P_j}, \mathbf{X}_1 \right) \right) \quad 8-2$$

is the profit of customer group j , p_j is the price paid by that customer group, N is the number of customer groups, sales to that customer group are q_j , γ represents the rate of commission paid by the firm on those sales and C_j the average cost of those sales. \mathbf{X}_1 is the vector of variables that affect demand and \mathbf{X}_3 the vector of variables that affect fixed and variable, and hence average cost. The profit of a firm as described in equation 8-1 could be expressed in terms of the four distribution channel groups, where $i = 1$ to 4, or alternatively in terms of the corporate and leisure groups or the first and return-visit groups where $i = 1$ to 2.¹¹⁸ For the purposes of the analysis in this chapter profit is expressed in terms of the distribution channel groups. This expression allows for an investigation of the effect of two of the distribution channel groups on profitability, the ‘retailers and online intermediaries group’ dominated by Wotif.com and the door channel group.

From equation 7-6 the post-commission price for a customer group can be expressed as a function of the following variables.¹¹⁹

$$p_j [1 - \gamma_j] = g(c_j(\mathbf{X}_2), \phi, \mathbf{X}_1) \quad 8-3$$

The characteristics of the firm variables in \mathbf{X}_2 , which are those that affect marginal cost, also appear in \mathbf{X}_3 in equation 8-2 where they affect average cost. It is therefore possible to express profitability in terms of the vectors \mathbf{X}_1 , \mathbf{X}_3 and ϕ to obtain an expression for profitability which does not contain the post-commission price variable. This is shown below.

$$\Pi_i = h(\mathbf{X}_1, \mathbf{X}_3, \phi) \quad 8-4$$

In equation 8-4 \mathbf{X}_1 is a vector of variables that affect demand and \mathbf{X}_3 is a vector of variables that affect fixed and variable costs.¹²⁰ The parameter ϕ measures how much the average

¹¹⁸ Recall from section 2.2 that Wotif.com was one of the two firms that dominated the ‘internet and online only travel provider’ category in Table 2.2 and that Wotif.com therefore dominate the ‘retailers and online intermediaries’ customer group in the four distribution channel categories in the questionnaire.

¹¹⁹ Equation 8-3 is a representation of equation 7-6. Note that substituting equation 7-5 into 7-4 gives $p_j [1 - \gamma_j]$ as an implicit function of the exogenous variables. Equation 8-3 is a representation of this function.

industry price influences the firm's demand for that customer group. As was noted in the previous chapter the extent to which the firm loses sales to its rivals following a price increase depends on the degree of competition and the degree to which their product can be substituted. This information is contained in the parameter ϕ . Firms in the short-stay accommodation industry gain market power over competitors from the differentiation of their products. This market power alone however does not necessarily imply monopoly profits in the long run. A monopolistically competitive industry, for example, implies zero long run monopoly profit but firms still have market power. Some of the firms in the short-stay accommodation industry in Tasmania report that they are making profit that is well above the expected return for this industry. This is consistent with the findings of Cubbin and Geroski (1987) on the persistence of long run profits in imperfectly competitive industries. It is assumed that monopoly profits are not driven to zero in the long run in this industry and this assumption suggests that there are barriers to entry. The discussions with the firms suggest a number of possible barriers to entry.¹²¹ These are the sunk costs deriving from capital investment, acquisition of Tourism Industry Council of Tasmania and AAA star rating accreditation, marketing and administration costs and opportunity costs of income sacrificed during the set-up period.

The profit of a firm as described by equation 8-4 can be expressed in terms of absolute level of profit or a percentage return. Because levels of profit will vary with the size of a firm a unit free measure is required. Two possible measures are return on assets or the return on equity and data for these variables was collected in the survey. Recall from Section 5.2.6 that 70% of respondents indicate no difference between their return on assets and return on equity suggesting a situation of no borrowing, 10% indicate that their return on equity is higher than their return on assets suggesting some borrowing and 20% indicate that their return on equity is lower than their return on assets. This latter result suggests the firm firms may be confused over what their liabilities are giving erroneous values for the return on equity. In view of this the return on equity data needs to be used with caution in the econometric analysis. Both measures are tested in the econometric analysis in Section 8.4 and the return on assets generates coefficients that have a higher level of significance. It is therefore likely that the return on assets is a more accurate measure of the rate of return for the firm. The discussion

¹²⁰ The notation \mathbf{X}_3 is used here since the notation \mathbf{X}_2 is used to represent the vector of variables that affect marginal cost in Chapter 7.

¹²¹ Based on information provided in discussion with firms in Stage 1 of the field work

in the rest of this section therefore focuses on profitability measured using the return on assets rather than the return on equity.

The characteristics of the firm variables in \mathbf{X}_1 refer to the type, size, star rating and location of the firm. As noted above these variables also affect average cost. This effect is discussed later in this section. The impact of the firm characteristics variables on profitability will therefore derive from their effect on average cost and on demand. There are no *a priori* indications of the direction of the affects of type, size, star rating and location on demand. As noted in the previous chapter in the discussion of elasticity of demand there will be customers who prefer bed and breakfast accommodation to hotel or motel accommodation, others who prefer a higher star rated accommodation to a low star rated accommodation and others who prefer smaller establishments to larger establishments.¹²² The direction of the relationship between these characteristics and demand will lie in the mix of idiosyncratic factors relating to preferences of individual customers.

The \mathbf{X}_1 vector also contains variables that relate to the seasonal demand in Tasmania, the lifestyle decisions made by the firm, and the degree of competition in the industry. The effect of seasonal demand means that profit will be lower when demand or prices are lower in the winter season compared to the summer season if revenue per room falls and average cost remains unchanged in the winter. As noted in the previous chapter prices are lower in winter than summer and there is a marked winter season. The effect of winter on profitability therefore derives from two sources; the lower demand in the winter season and the lower prices charged in the winter.¹²³ Both of these effects suggest the impact of the winter season on profit can be expected to be quite pronounced.

Profitability may also be affected by the decisions firms make about lifestyle choices. The owner operators may compensate for lower profitability with higher non-pecuniary benefits in terms of improved lifestyle.

The degree of competition facing the firm is likely to have an impact on demand and to affect profitability. As noted in the previous chapter this effect is described by the ϕ variable. In the previous chapter prices of short-stay accommodation were found to be significantly lower

¹²² These preferences are all unobserved.

¹²³ Variations in average cost associated with the winter season are assumed to be incorporated in the \mathbf{X}_3 vector of variables.

where firms faced a more competitive market so that if average cost remains unchanged then profitability will be lower in more competitive markets.

As noted above, profit is expressed in terms of the distribution channel groups to allow for an investigation of the effect of two of the distribution channel groups on profitability. These are the retailers channel and the door channel. As noted in Chapter 2 the appearance of the online retailers, and in particular Wotif.com in 2000, provided firms with a potential new distribution channel which allow firms to more finely segment their market. For example prices can easily be varied across the days of the week on Wotif.com. Although firms can also do this for their door customers Wotif.com allows the variation in prices to be communicated more readily to a wider audience. By offering a range of prices the firm may be able to capture more consumer surplus from their customers thereby increasing their profit. The use of Wotif.com may also allow firms to increase profit by expanding their market share. By using Wotif.com the firms can communicate information online about prices and characteristics of the short-stay accommodation to potential customers. Wotif.com can therefore act as a marketing device by making information available that would otherwise be too costly to communicate. Potential international and domestic customers with internet access can all access Wotif.com. Firms who rely on print media may access fewer potential customers than those firms using Wotif.com or other online sites. The two effects on profitability are here discussed separately although the survey data does not allow the two effects to be distinguished.

It should be noted that the two quarters for which the survey data was collected were a period of changeover for the industry with firms starting to adopt the online channels of which Wotif.com was the largest at the time. The changeover provides the opportunity to investigate differences in profitability for those firms who had adopted Wotif.com and those that had not adopted Wotif.com.

The impact on profitability of the introduction of Wotif.com can be captured by modifying the above model by adding a $N+1^{\text{th}}$ distribution channel (Wotif.com) and a cost, I , if implementing Wotif.com.

$$\Pi_i^W = \sum_{j=1}^{N+1} \Pi_{ij} - I \quad 8-5$$

Note the firm will only adopt Wotif.com if this action increases profit, i.e. if $\Pi_i^W > \Pi_i$

For this purpose, a dummy variable *wotif* is included in the firm's profit equation. At this stage the objective is to discover whether firms using this distribution channel enjoy higher profitability. Of course, firms could enjoy higher profits because Wotif.com increases revenues, or because it lowers costs. These issues are explored in more detail in section 8.3 below.

The proportion of sales made at the door is also included as an explanatory variable X_1 . The analysis and discussions in Chapter 7 of the effect of relationship between the use of the four distribution channels and elasticity also provided some limited evidence that customers using the door channel have less elastic demand than the other channels. This is consistent with customers purchasing at the door having fewer substitutes than those purchasing through the other distribution channels. The firm also pays no commission on sales at the door.¹²⁴ It is possible therefore that those firms making a larger proportion of their sales at the door may be more profitable than otherwise. Including the proportion of sales at the door as a variable in the analysis of profitability allows the elasticity information that firms use for direct price discrimination purposes to be included in the investigation.

The X_3 vector of variables in equation 8-4 that affect average cost relate to the firm characteristics variables. These are the type, size, star rating and location of the firm. The type of firm may affect average costs if there is some expectation within the industry that particular services will be associated with accommodation types. For instance a hotel firm may be expected to provide a restaurant whereas a bed and breakfast firm may not be expected to do this.¹²⁵ The fixed capital costs incurred by a firm which provides a restaurant would increase average costs relative to a firm not providing a restaurant. The size of the firm may also affect average costs if the operators of the larger firms are able to take advantage of economies of scale. Larger firms may also have access to less risky borrowing if they have a large asset base and hence more collateral than smaller firms. The assumption is that more collateral implies less risky borrowing which in turn implies lower costs of borrowing.

¹²⁴ Commission is paid for sales through the wholesaler and retailer channel. Web sales incur a charge arising from the cost of operating the website.

¹²⁵ Based on information provided by firms in Stage 1 of the fieldwork.

The star rating of the firm may also affect average cost. Acquiring a star rating involves one-off fixed costs and the variable cost of providing a room night increases with the star rating value.¹²⁶ The location of the firm may also affect average cost. As noted in the discussion of marginal cost in the previous chapter those firms located away from the ports and urban centres may require both variable and capital inputs to be transported relatively long distances which will increase the average cost for these firms. It is therefore possible that firms in the more remote areas will have higher average costs than those located closer to ports or urban centres.¹²⁷

In order to estimate an equation based on equation 8-4 and the discussion of the factors that affect profitability, it is important to note once again that the type and size variables are highly correlated.¹²⁸ The larger firms are usually hotels or motels and the smaller firms bed and breakfast or guest houses. Including both of these variables in an estimating equation would lead to collinearity. The size of firm variable captures the economies of scale and riskiness factors already discussed. It is argued that the need to consider these factors requires the size of the firm to be used rather than the type of firm in the estimating equation. Excluding the type variable means that the size variable is acting as a proxy for the type of firm.

The above discussion of the model of the firm motivates the following estimating equation:

$$\begin{aligned} \Pi_i = & \beta_1 noofrooms + \beta_2 star35less + \beta_3 urban + \beta_4 competition \\ & + \beta_5 propdoor + \beta_6 wotif + \beta_7 lifestyle + \beta_8 winter + \varepsilon_i \end{aligned} \quad 8-6$$

In equation 8-6 the variable *noofrooms* is a continuous variable that denotes the natural logarithm of the number of rooms in the firm. The *propdoor* is also a continuous variable and denotes the natural logarithm of the proportion of sales at the door.¹²⁹ *wotif* is a dummy variable denoting whether or not the firm uses Wotif.com.¹³⁰ The *competition* variable is the

¹²⁶ Based on information provided by firms in Stage 1 of the fieldwork.

¹²⁷ Based on information provided by firms in Stage 1 of the fieldwork.

¹²⁸ This is shown in the correlation matrix in Table 5.14 in Chapter Data summary of SABD5.

¹²⁹ The variable is derived from the survey data (Questions 14 to 15) and is a continuous variable.

¹³⁰ The variable takes a value of 1 if the business uses Wotif.com and 0 otherwise.

same as that constructed for the analysis in the previous chapter.¹³¹ The effect of winter is captured by including the dummy variable *winter*.¹³² Some simplification of the firm characteristics data is required for the remaining variables to allow for sufficient degrees of freedom and enable the generation of a more parsimonious model. The 6 star rating categories are simplified into two groups to create the variable denoted *star35less*.¹³³ The location variable *urban* is created by splitting the regions into urban and non-urban.¹³⁴ The *lifestyle* variable is constructed by simplifying the responses from the survey.¹³⁵ The β_i 's in equation 8-6 are the coefficients to be estimated and ε_i is an error term where the errors are assumed to be distributed normally with a mean of 0 and variance of 1.

Equation 8-6 is estimated using two measures of profitability. These are the return on assets and return on equity and are called *assets* and *equity*.¹³⁶ Although the discussion in Section 8.2 is framed in terms of the return on assets both profitability variables are tested in equation 8.4.

8.2 Estimation and results

Two versions of equation 8-6 are estimated using an ordered probit model with *assets* as the profitability measure. Estimating two versions of equation 8-6 allows the data from the questions about lifestyle in the survey to be used. The first of the versions is shown in equation 8-7 below. The *lifestyle* variable is omitted from equation 8-7 as the data used for the estimation includes all firms and not simply those where the owner operator is the respondent. The *urban* variable is also omitted as this is not significant at the 10% level.

$$\pi_i = \beta_1 noofrooms + \beta_2 star35less + \beta_3 competition + \beta_4 propdoor + \beta_5 wotif + \beta_6 winter + \varepsilon_i \quad 8-7$$

The second version of equation 8-6 includes the *lifestyle* variable and is shown in equation 8-8. The data from the owner operators is used for this estimation. Variables are also omitted

¹³¹ The responses to the competitiveness question (Question 41) are simplified. The dummy takes a value of 1 for the first two responses to the question (very competitive and competitive) and a value of 0 for the three remaining responses to the question (neutral, not very competitive and not competitive at all).

¹³² The variable takes a value of 1 in winter and 0 otherwise.

¹³³ The dummy variable takes a value of 1 for those businesses that are 3.5 stars and below and 0 otherwise.

¹³⁴ The variable takes a value of 1 if the business is in the regions described as devonport, hobart or launceston in Appendix 8 and 0 otherwise.

¹³⁵ The responses to the lifestyle question (Question 7) are simplified. The dummy takes a value of 1 for the first two responses to the question (very important and important) and a value of 0 for the three remaining responses to the question (neutral, not very important and not important).

¹³⁶ The data used for these variables is derived from the survey (Questions 35 to 40).

where they are not significant at the 10% level. As the sample size for estimating equation 8-8 is smaller than for equation 8-7 it is necessary to retain only the significant variables to allow sufficient degrees of freedom.

$$\pi_i = \beta_2 star35less + \beta_4 competition + \beta_6 wotif + \beta_7 lifestyle + \beta_8 winter + \varepsilon_i \quad 8-8$$

Polychoric correlations of the variables in equations 8-7 and 8-8 are also calculated so that any multicollinearity issues can be allowed for in the analysis. The correlation matrix is shown below.

Table 8.1 Polychoric correlation matrix of explanatory variables

	noofrooms	star35less	competition	propdoor	wotif	winter
noofrooms	1					
star35less	0.247*	1				
competition	0.193	0.030	1			
propdoor	-0.138	-0.044	-0.425*	1		
wotif	0.359*	0.768*	0.263	-0.496*	1	
winter	7E-11	6E-05	-0.072	0.0349	6E-05	1

* significant at the 5% level

There are a number of correlations which are significant at the 5% level. Caution needs to be taken therefore in interpreting the results of the estimation of A and B since there are likely to be multicollinearity issues.

The results of the estimation of equations 8-7 and 8-8 are shown in Table 8.2 and denoted A and B.^{137 138}

¹³⁷ The cut points are not reported in Table 8.2 but are available in Appendix 12.

¹³⁸ The number of observations is N=56 and 50. This number represents the firms, out of a possible maximum of 85, who answered the questions on assets, equity, competition and lifestyle. Not all respondents answered all questions so the data used in the estimations represent a sample of responses from the respondent group. Chi-squared tests of the distributions for the star rating, region and room size categories are generated for the firms responding to these questions and for the firms in the respondent group. They indicate no significant difference at the 5% level between the sample of firms responding to these questions and the respondent group. The results can therefore be used for inference purposes.

Table 8.2 Ordered probit estimates for return on assets

A		B	
<u>Dependent variable</u>	<i>assets</i>	<u>Dependent variable</u>	<i>assets</i>
<i>noofrooms</i>	-0.00754 (-1.44)		
<i>star35less</i>	-1.274** (-2.83)	<i>star35less</i>	-1.194** (-2.99)
<i>competition</i>	-0.575 (-1.52)		
<i>propdoor</i>	0.0198* (2.00)		
<i>wotif</i>	1.162** (2.67)	<i>wotif</i>	1.241** (3.10)
		<i>lifestyle</i>	-1.288*** (-3.43)
<i>winter</i>	-0.744* (-2.36)	<i>winter</i>	-0.890** (-2.63)
	N = 56		N = 50

z statistics in parentheses

* p<0.05 ** p<0.01 ***p<0.001

The dummy variable *wotif* is positive and significant at the 1% level in both A and B and a key finding is that the use of Wotif.com increases profitability. This finding is explored in more detail in Section 8.3.

The coefficient on the *propdoor* variable has a positive sign in A and the variable is significant at the 5% level. This result indicates that use of the door channel increases profitability relative to the use of the other channels. This finding provides evidence to support the *a priori* hypothesis that the larger the proportion of sales through the door channel, the more profitable the firm.¹³⁹

Two reasons are proposed to explain this finding. The first reason arises from the results in the previous chapter about the elasticity of demand and the door channel customers which suggest that door customers have lower elasticity of demand relative to the other channels. If the firm is using direct price discrimination the door customers pay a higher price relative to customers using the other channels. The firm may have scope for perfect price discrimination if they can assess the sensitivity of individual customers. Assessing the sensitivity of their door customers may be easier in person than on the phone or online. If a door customer has information about the price and availability of substitutes they may use this information to bargain with the firm for a particular price, thereby revealing their price sensitivity. The second reason for the positive coefficient on the *propdoor* variable in A is that is that the firms pay no commission on sales at the door. A higher proportion of sales at the door *ceteris paribus* will therefore be more profitable.

The dummy variable *star35less* is significant at the 1% level in A and B. The coefficient on this variable has a negative sign, which means that as the star rating falls profitability increases. It was not clear *a priori* how the star rating would affect profitability. As noted in Section 8.1, the star rating of a firm can affect costs and demand, with lower star rated firms having lower costs per guest night than those with a higher star rating and with demand being affected by the idiosyncratic preferences of customers. The coefficients on the *star35less* variable in A and B may therefore be capturing both of these effects.

The dummy variable *winter* is significant at the 5% level in A and at the 1% level in B. The coefficient on this variable is negative suggesting that profitability is lower in the winter. This result is consistent with the *a priori* hypothesis. This result is also consistent with the finding in the previous chapter that the elasticity of demand is higher in winter. The firms have to

¹³⁹ The other channels are wholesaler, retailer and web.

charge lower prices in winter than summer as their customers are more sensitive to price in winter. If these lower prices are not reflected in lower costs between summer and winter then profit will be lower in winter than summer.

The coefficients on the *competition* and *noofrooms* variables in A are not significant at the 5% level. It is possible that because there are relatively few large firms in the sample of firm respondents it is not possible to test the effect of size of rooms on profitability. The *competition* and *noofrooms* variables are also correlated with some of the other independent variables so multicollinearity issues may be affecting the significance of these variables. A larger data set could be used in future to address these issues in the future.

The dummy variable *urban* is not significant at the 10% level in either A or B and so is excluded from the regressions. This is the variable that controls for variations in profitability arising from differences in costs and demand across the regions. It appears that location is not a key determinant of profitability. Even though costs may vary across the regions this difference is not reflected in differences in profitability. If profitability did vary across regions there would be an incentive for firms to move between regions and capture the higher profits. It should be noted that if the survey data reflects a long run equilibrium in the industry then the *urban* variable would not be significant.

The *lifestyle* variable in B is negative and significant at the 0.1%. The coefficient on the variable is negative. This result suggests that where the owner operators regard making a lifestyle change as being very important their profitability is low and where making a lifestyle change is not important their profitability is high. It appears therefore that the owner operators may be compensating for lower profitability with increased benefits from their lifestyle choice; they owners may be trading off lifestyle against profits.

Equation 8.3 is also estimated using an ordered probit model with *equity* as the measure of profitability.¹⁴⁰ The same sets of variables are used as in the A and B estimates, but with *equity* as the dependent variable. Estimating A with *equity* as the dependent variable generates coefficients on the explanatory variables that have lower levels of significance than when *assets* is used as the dependent variable. Using *equity* in B generates significant coefficients *wotif*, *lifestyle* and the *winter* variables. However given the concerns expressed in Section 5.2.6 concerning the return on equity measure, caution should be taken in interpreting these results. For this reason only the marginal effects from the estimation of A and B with

¹⁴⁰ The results of this estimation are reported in Appendix 12.

assets as the dependent variable are now reported and discussed. The reason for generating the marginal effects is so that the expected magnitude of the changes in profitability based on the coefficients in Table 8.2 can be determined. The marginal effects are only reported for the variables that are significant at the 5% level in A and B.

The only continuous variable is *propdoor*. Changes in profitability represent the effect of a one unit change in the variable.¹⁴¹ For example with a one unit increase in the proportion of guest nights sold at the door the probability of obtaining Outcome 1 (less than 3% return on assets) decreases by 0.7% and the probability of obtaining Outcome 5 (more than 10%) increases by 0.4%. The effect of the *propdoor* variable on assets is relatively small therefore in A. The remaining variables are all dummy variables. Changes in profitability represent the binary change in these variables. For example from B when a firm uses Wotif.com the probability of obtaining Outcome 1 (less than 3%) decreases by 41.5% and the probability of obtaining Outcome 5 (more than 10%) increases by 21.3%.

¹⁴¹ Where profitability is measured using return on assets.

Table 8.3 Marginal effects for A and B

A	Dependent variable : assets				
	Pr (Outcome 1)	Pr (Outcome 2)	Pr (Outcome 3)	Pr (Outcome 4)	Pr (Outcome 5)
star35less	0.469	-0.126	-0.135	-0.017	-0.191
propdoor	-0.007	0.000	0.002	0.000	0.004
wotif	-0.415	0.061	0.124	0.017	0.213
winter	0.264	-0.020	-0.083	-0.012	-0.150

B	Dependent variable : assets				
	Pr (Outcome 1)	Pr (Outcome 2)	Pr (Outcome 3)	Pr (Outcome 4)*	Pr (Outcome 5)
star35less	0.410	0.000	-0.189		-0.222
wotif	-0.426	0.003	0.195		0.228
lifestyle	0.324	0.156	-0.108		-0.372
winter	0.278	0.057	-0.128		-0.207

*There are no values for Outcome 4

It should be noted that the estimated coefficient on *wotif* is likely to be higher than that in the population for which inferences are being made because of an endogeneity issue. The reason for the endogeneity is that only those firms that believe or know that using Wotif.com will be profitable for them will choose to use Wotif.com. Thus the estimated parameter on the Wotif.com dummy variable does not provide us with an indication of how much profit would increase by using Wotif for all firms. Rather it gives the profit increase for those firms that chose to use Wotif.com (probably because it was profitable for them) and so is likely to be higher. The endogeneity means that the estimation of the relationship between profit and the use of wotif.com cannot be explained in terms of effects but rather just correlation. However it is useful to seek an explanation about the reason why firms adopt Wotif.com.

8.3 The use of Wotif.com and information technology resources

The two quarters for which data was collected were a period of changeover for the industry in terms of electronic selling. Some firms had already adopted the use of Wotif.com whereas others had not. There is an incentive for all firms to adopt the use of Wotif.com if it increases profitability, and so we now investigate why some firms had not adopted Wotif.com at the time of the survey. It is possible that there is some unobserved exogenous constraint that deters the firms from using Wotif.com. The hypothesis proposed is that only those firms for which online technology is low cost are willing to use the site. The use of Wotif.com may require information technology support services that increase one or both of variable or fixed costs. Firms will only adopt the site where the profit from the additional sales is greater than any increase in costs. It is not possible to observe the costs of adoption of Wotif.com. However it is possible to observe which firms had already adopted other information technology resources, for example the use of an online booking facility or internet access in rooms. It is hypothesized that for the firms who had already adopted these technologies, the cost of adoption of Wotif.com would be lower and the use of Wotif.com would be profitable and they would therefore be able to adopt Wotif.com.

There should be a positive relationship between the use of Wotif.com and whether the firm has an online booking facility or offers internet access in rooms. To test this hypothesis a simple equation is proposed and shown below in equation 8.9.

$$wotif_i = \beta_1 E_i + \varepsilon_i \quad 8-9$$

In Equation 8-9 the $wotif_i$ variable indicates whether or not the firm uses Wotif.com.¹⁴² The variable E_i indicates whether a firm uses an online booking facility or has internet access in the rooms and ε is an error term. The dummy variable for online booking facility is called *onlinebooking*.¹⁴³ The dummy variable for internet access in the rooms is called *internetroom*.¹⁴⁴ Equation 8-9 is tested with a binary probit model as the dependent variable *wotif* is a binary variable and using the *onlinebooking* and *internetroom* variable in turn. The results of the estimations are reported below in Table 8.3.¹⁴⁵

Table 8.4 Binary probit estimation for wotif and information technology

	C	D
Dependent variable	<i>wotif</i>	<i>wotif</i>
<i>onlinebooking</i>	0.570*** (5.29)	
<i>internetroom</i>		0.311** (2.87)
	N = 85	N = 85

z statistics in parentheses

* p<0.05 ** p<0.01 *** p<0.001

The coefficients on *onlinebooking* and *internetroom* are positive and significant at the 0.01 percentage level. The coefficient values indicate that, for example, the change from not having an online booking facility to having an online booking facility increases the likelihood of using Wotif.com by around half a percentage point. The results in Table 8.3 provide evidence that supports the hypothesis that only those firms using an online booking facility or offering internet access in rooms will find the cost of adoption low enough to use Wotif.com. It is also possible that there are other variables that are explaining the use of Wotif.com which are not observed. The estimation of C and D would therefore suffer from omitted variables issues. The resolving of such issues is a topic for future research.

¹⁴² This variable takes a value of 1 if the business uses Wotif.com and zero otherwise.

¹⁴³ This variable takes a value of 1 if the business has an online booking facility and zero otherwise.

¹⁴⁴ This variable takes a value of 1 if the business has internet access in rooms and zero otherwise.

¹⁴⁵ The number of firms participating in the survey is 85 which corresponds to N=85.

8.4 Conclusions

The factors that affect profitability were investigated in this chapter. The theoretical model developed in Chapter 6 is used as the basis for this investigation. A reduced form equation is specified that models profit as a function of the proportion of sales the firm makes at the door; whether the firm uses the site Wotif.com; the characteristics of the firm, seasonal effects and lifestyle decisions by firms. Data from the survey are used to test the impact of these factors on profitability.

The use of Wotif.com is found to have a positive and significant effect on profitability. Profitability may increase when a firm uses Wotif.com for two reasons. The first is that Wotif.com allows the operator to increase profit by more finely segmenting the market. The second is that Wotif.com acts as a marketing device and enables the firm to attract new customers and increase their market share. It is not possible to definitively distinguish the impact of these two effects on profitability. A hypothesis is proposed to explain why some firms adopt Wotif.com and others do not. This hypothesis is based on the firm's costs of adoption of Wotif.com. Where costs of adoption are low firms use Wotif.com.

The use of the door channel also has a positive and significant effect on profitability although the effect is relatively small. Profitability is found to increase when the star rating of the firm decreases. Profitability also falls significantly in winter. Making a lifestyle choice to operate a short-stay accommodation firm is found to have a negative impact on profitability. The location and competition facing the firm are not found to effect profitability. Finally, return on assets is found to be the better measure of profitability using the model specified in this chapter.

9 Discussion and conclusions

This final chapter draws together the findings of the present investigation of the short-stay accommodation industry. Pricing strategies and profitability of firms in this industry in Tasmania were investigated.

In Chapter 1 the broad theme of the research and three specific research questions associated with pricing strategies and profitability in the short-stay accommodation industry were identified. The industry and the extant data were discussed in Chapter 2 and recent empirical work on price discrimination and profitability in an imperfectly competitive environment was reviewed in Chapter 3. The discussions in Chapters 2 and 3 led to the decision to investigate the broad theme and specific research questions using data generated from a survey of firms in the short-stay accommodation industry. The process of generating this data set was described in Chapter 4 and a summary of the data and findings from this data was reported in Chapter 5. In Chapters 6, 7 and 8 the results of the econometric investigation of the specific research questions were discussed.

This thesis makes a contribution to the research in industrial organisation in two areas. The first contribution relates to the methods used in the investigation. A survey of short-stay accommodation firms was carried out to generate data, which provided an opportunity to gain insight into the decision making in this industry. The second contribution relates to econometric investigation of the three specific research questions identified in Chapter 1.

The remainder of this chapter elaborates these contributions. In Section 9.1 the survey methodology and the insights from using this approach in the investigation are discussed. The issues that arose in the use of this methodology are discussed, as are the resolution of these issues. Section 9.2 provides a discussion of the results of the key findings from the investigation of the first research question on direct price discrimination. In Section 9.3 the key findings of the investigation of the second research question are discussed. This question asked about the factors that affect the elasticity of demand. The key findings of the investigation of the third research question on the factors that affect profitability are discussed in Section 9.4. The chapter finishes with a discussion of the directions for future research in Section 9.5 and concluding remarks in Section 9.6.

9.1 Using a survey to investigate pricing strategies and profitability

The investigation in this thesis takes a different approach to many of the recent empirical studies of pricing strategies and profitability in imperfectly competitive environments. The studies are mainly focussed on using extant data (with Reid (1993) being an important exception). In this thesis data are collected directly from firms which enables questions to be asked, and data collected, that would not otherwise have been possible. The methodology contribution of this research concerns the design and use of a questionnaire to investigate questions about pricing strategies and profitability of firms. The multi-stage fieldwork method described in Chapter 4 reveal interesting findings associated with the pricing decisions of firms and the pricing strategies and profitability that eventuate.

Two particular innovations in the questionnaire concerning the collection of elasticity of demand and marginal cost data are of note. As discussed in Chapter 3, obtaining data on elasticity of demand and marginal cost can be problematic when investigating pricing strategies. There may be identification issues associated with the use of sales and prices data when estimating elasticity of demand. The questionnaire used in the investigation in this thesis asks firms about what happens to their revenue following a change in price rather than asking about what happens to demand following a change in price. The discussions with the industry representatives and firms documented in Chapter 4 reveal that this is a much easier way to ask about the elasticity of demand since it aligns more closely to the way that firms make their decisions. It was possible to use the data generated from the elasticity questions in the analysis of direct price discrimination and the determinants of elasticity in this investigation.

Researchers requiring measures of marginal cost often have to use accounting data which are designed for purposes other than empirical testing of direct price discrimination. In many cases accounting data contains information on average costs rather than marginal costs. The questionnaire used in this thesis generates data on marginal cost by asking firms to consider the cost of, for example, selling a guest night to a corporate customer relative to selling a guest night to a leisure customer. Asking about marginal cost in this way, i.e. by framing the question in relative rather than absolute terms, makes it easier for the firm to answer the question. Despite framing the question in this manner however there were still issues with the quality of data generated when it was used in the analysis of direct price discrimination.

The survey methodology used here also demonstrates that the process of developing a questionnaire instrument allows questions about the pricing decisions of firms to be explored.

The survey development and administration described in Chapters 4 uncovered the way that firms in the short-stay accommodation industry use price discrimination strategies. Direct price discrimination is being used with firms distinguishing between how customers made their booking, whether they were a corporate, leisure, first visit or return visit customer in their pricing strategy. The discussions with the industry representatives and firms, supported by analysis of data from the survey in Chapter 5, establishes that firms in this industry have sufficient information about their customers' elasticity of demand to use direct price discrimination strategies. Indirect price discrimination is observed in the industry but the interviews in Stage 1 and pilot survey data in Stage 2 revealed that a substantial fraction of the firms could not explain their motivation for offering quantity discounts, particularly in terms of generating maximum profit from high demand customers. It was not possible to ask questions about indirect price discrimination in the survey.

9.2 Direct price discrimination

The first research question posed in Chapter 1 asks whether firms in the short-stay accommodation industry are using direct price discrimination strategies. Price, elasticity and marginal cost data collected in the survey are used to test the hypothesis that firms in the short-stay accommodation industry use such strategies. The customer groups the firms identify for the purpose of direct price discrimination are the distribution channels the customers use, and whether they are corporate, leisure, return-visit or first-visit customers. An imperfectly competitive model is used to generate a modified version of the Lerner index. This version of the Lerner index is used to specify the estimating equation. Since the econometric analysis supports the hypothesis that firms who report no variation in cost between customer groups are using direct price discrimination strategies and they can only use direct price discrimination when there are differences in the elasticity of demand across customer groups this raise the interesting question – what factors determine the elasticity of demand?

9.3 Elasticity of demand

A two stage model is used to test the significance of the factors that affect the elasticity of demand in equilibrium. Two equations are specified based on the imperfectly competitive model developed in Chapter 6. A reduced form equation is developed that models the

relationship between pre-commission price and a number of explanatory variables. These variables are the star rating, region, size of the firm, degree of competition in the market, whether it is the winter or summer season and the distribution channel used by the firm. The estimation of the reduced form equation is the first stage of the model. This estimation allows the effect of marginal cost on price to be estimated. Significant coefficients are generated for five of the six star rating categories and for all the regions. The competition variable is found to have a significant negative coefficient in the first stage equation. This result indicates that as competition increases price falls.

The elasticity of demand in equilibrium is estimated in the second stage equation and is found to be a function of the competitiveness of the industry and whether or not it is the winter or summer season. The results indicate that as the market becomes more competitive, or if it is the winter season, firms face an increase in their elasticity of demand in equilibrium. Although the impact of the characteristics of the firm on elasticity are not directly estimated in the second stage their effect can be determined by considering the coefficients on the star rating and region variables in the first stage and on the fitted price variable in the second stage. The combined effect indicates that elasticity of demand does vary in a systematic way across these categories. Elasticity is lower for a higher star rated firm and for those firms in urban areas. However caution should be taken with these inferences. The star rating and region variables are being used in the first stage equation as a proxy for marginal cost but they may also have an impact on demand. It is not possible to separate the two effects in the analysis.

9.4 Profitability

The third research question posed in Chapter 1 asks what factors determine the profitability of firms in the short-stay accommodation industry in Tasmania. The imperfectly competitive model presented in Chapter 6 again provides the basis for identifying the factors that affect profitability. A reduced form equation is developed where profit is specified as a function of the characteristics of the firms, seasonal effects and lifestyle decisions by owners of the firm. The firm characteristics are the type, size, star rating and location of the firm, the proportion of sales made at the door of the firm, whether the firm uses the Wotif.com site and the degree of competition facing the firm. Seasonal effects on profit result from whether the period under consideration is a winter or summer. The decision by a firm to make a lifestyle change is also hypothesized to affect profit. Profit is measured by using the responses on the question regarding return on assets in the survey.

Data from the survey are used to test the impact of these factors on profitability. The use of the door as a distribution channel has a positive and significant effect on profitability. Profitability is found to increase with a fall in the star rating of the firm. Profitability also falls significantly in winter. Making a lifestyle choice to operate a short-stay accommodation firm is found to have a negative impact on profitability. The location and competition facing the firm are not found to effect profitability. Finally return on assets is found to be the better measure of profitability using the model specified in this chapter.

The use of Wotif.com is found to have a positive and significant effect on profitability. Two reasons for this increase in profitability are proposed. The first is that Wotif.com allows the firm to more finely segment their market. The second is that Wotif.com acts as a marketing device and allows firms to increase their market share. It allows firms to advertise online and gives access to anyone with an internet connection. It is not possible to definitively distinguish the impact of these two explanations for the increase in profitability associated with the use of Wotif.com.

A hypothesis is however proposed to explain why some firms have adopted Wotif.com whereas others have not despite the fact that using Wotif.com appears to increase profitability. This hypothesis is based on the firm's costs of adoption of Wotif.com. The analysis suggests that where costs of adoption are low, firms use Wotif.com.

9.5 Recommendations for future research

The investigation in this thesis raises a number of possible directions for future research. These can be divided into those that relate to the substantive empirical analysis of pricing and profitability and those that relate to the methodology used in the investigation.

The empirical analysis in this thesis focuses on pricing strategies and profitability in the short-stay accommodation industry in Tasmania. Extending the analysis to other States in Australia or other countries would enable a more extensive study of pricing decisions by firms. It would then be possible to identify any systematic differences in pricing strategies and profitability across the States or across countries. Such a study would also generate a larger database which could be used to test the three specific research questions identified in Chapter 1. A repeat of the Tasmanian study would be useful so as to generate a companion dataset based on economic conditions which are much less buoyant than when the survey for

the current study was completed in 2008. Such a study would have the advantage of controlling for many of the State-specific factors.

In the investigation of profitability, which is the focus of the third research question and the analysis in Chapter 8, the use of Wotif.com is found to be a significant determinant of profitability. It is not possible to definitively establish why using this site increases profitability. Further analysis of the use of Wotif.com could determine the source of this effect by asking firms about their motivation for using Wotif.com. It would be helpful to ask firms whether using Wotif.com increased their sales. A larger proportion of firms in the short-stay accommodation firm population now use Wotif.com compared to the period of the survey. However some firms have still not adopted Wotif.com. Research on the reasons for adoption or non-adoption could be investigated.

The use of a survey to generate data for the investigation in this thesis departs from the approach of many of the empirical studies of pricing strategies and profitability described in Chapter 3. Almost all recent studies use extant data sets. The use of a survey means that questions can be designed with the specific purpose of generating questions relevant to the research.

The data generated from the questions about elasticity of demand performed effectively in the econometric analysis. Further research however could refine the collection of marginal cost data. The questions on marginal cost generated data which was ordered but this data had to be included as dummy variables in the estimation of direct price discrimination in Chapter 6. These dummy variables generated insignificant coefficients for marginal cost. Converting the ordered data to continuous data did not improve the significance of the coefficient on marginal cost. Further research into asking about marginal cost would be helpful since it is a key variable in the Lerner index which is used to test for direct price discrimination. Developing a reliable questionnaire on quantifying firm's marginal costs would sidestep the problems associated with generating data on marginal cost from accounting data described in Chapter 3.

9.6 Concluding statement

In this thesis, the investigation of pricing strategies and profitability in the short-stay accommodation industry in Tasmania began with a number of observations about the state of the industry in Tasmania. Firms were observed to be using various pricing strategies. There

appeared to be sufficient variation across firms to use this industry for an investigation of systematic pricing strategies in an imperfectly competitive industry. The investigation was based on primary data obtained from a survey of short-stay accommodation firms. The use of a survey allowed for innovations in asking firms about marginal cost and elasticity of demand – in turn, this information was used to test models of pricing strategies and their impact on profitability.

The development of the questionnaire involved discussions with industry representatives and firms which provided an opportunity to investigate the decision making in the industry. The data from the survey revealed information about the pricing strategies and profitability of firms in the industry. Econometric analysis of the data allowed this information to be further developed. Evidence of direct price discrimination was found. The factors that determine the elasticity of demand in this industry were established. Profitability of the firms was also found to be a function of a number of factors. Amongst these factors it emerged that whether the firm used Wotif.com was an important determinant of profitability. Further research could usefully investigate why firms using Wotif.com are more profitable.

References

Australian Bureau of Statistics, Tourist Accommodation, Small Area Data, Tasmania, Quarterly Series, 8635.6.55.001, June 2005.

Australian Bureau of Statistics, State Final Demand, Detailed Components, Tasmania, Quarterly Series, 5206.6, June 2004.

Australian Bureau of Statistics, Survey Design Course, 19-20 June 2007, Hobart.

Bain, J. (1951). "Relation of profit rate to industry concentration: American manufacturing, 1936-40." Quarterly Journal of Economics **31**: 293-324.

Bain, J. (1956). Barriers to new competition: Their character and consequences in manufacturing industries. Cambridge, MA, Harvard University Press.

Bewley, T. (1999). Why wages don't fall in a recession. Cambridge, MA, Harvard University Press.

Blinder, A., E. Canetti, et al. (1998). Asking about prices. A new approach to understanding price stickiness. New York, Russell Sage Foundation.

Borenstein, S. (1985). "Price discrimination in free-entry markets." RAND Journal of Economics **16**(3): 380-397.

Borenstein, S. (1991). "Selling costs and switching costs: explaining retail gasoline margins." RAND Journal of Economics **3**(Autumn): 354-369.

Borenstein, S. and N. Rose (1994). "Competition and price dispersion in the U.S. airline industry." Journal of Political Economy **102**(4): 653-683.

Bresnahan, T. and R. Schmalensee (1987). "The empirical renaissance in industrial economics: an overview." Journal of Industrial Economics **35**(4): 371-378.

Busse, M. and M. Rysman (2005). "Competition and price discrimination in Yellow Pages advertising." RAND Journal of Economics **36**(2): 378-390.

Cabolis, C., S. Clerides, et al. (2007). "A textbook example of international price discrimination." Economics Letters **95**(1): 91-95.

Carlton, D. and J. Perloff (2005). Modern Industrial Organization. Boston, Pearson Addison Wesley.

Cubbin, J. and P. Geroski (1987). "The convergence of profits in the long-run: Inter-firm and inter-industry comparisons." Journal of Industrial Economics **35**(4): 427-442.

Discover Tasmania, <http://www.discovertasmania.com.au/> viewed on 30 September 2007 and 31 March 2008.

Feeny, S. and M. Rogers (1998). "Profitability in Australian enterprises." Melbourne Institute Working Paper(No.21/98): 1-34.

Freese, J. and S. Long (2005). Regression models for categorical dependent variables using Stata. College Station, Texas, Stata Press.

Genesove, D. and W. Mullin (1998). "Testing static oligopoly models: Conduct and cost in the sugar industry, 1890-1914." RAND Journal of Economics **19**(2): 355-377.

Gilbert, R. (1984). "Bank market structure and competition: a survey." Journal of Money Credit and Banking **16**(4): 617-645.

Greene, W. (2003). Econometric analysis. Upper Saddle River, Prentice Hall.

Griliches, Z. (1971). Price Indexes and Quality Change. Cambridge, Massachusetts, Harvard University Press.

Hall, R. and C. Hitch (1939). "Price theory and consumer behaviour." Oxford Economic Papers(May): 12-45.

Hyde, C. and J. Perloff (1998). "Multimarket market power estimation: the Australian retail meat market." Applied Economics **30**(9): 1169-1176.

Kalton, G. (1983). Introduction to Survey Sampling. London, Sage Publications.

Knetter, M. (1989). "Price discrimination by U.S. and German exporters." American Economic Review **79**(1): 198-210.

Leslie, P. (2004). "Price discrimination in Broadway theater." RAND Journal of Economics **35**(3): 520-541.

Lipczynski, J., J. Wilson, et al. (2005). Industrial Organization. Competition, Strategy, Policy. Harlow, Pearson Education Limited.

Machin, S. and M. Stewart (1990). "Unions and the financial performance of British private sector establishments." Journal of Applied Econometrics **5**: 327-350.

Machin, S. and M. Stewart (1996). "Trade unions and financial performance." Oxford Economic Papers **48**(2): 213-241.

Mason, E. (1939). "Price and production policies of large-scale enterprises." American Economic Review **29**: 61-74.

Mason, E. (1949). "The current state of the monopoly problem in the United States." Harvard Law Review **62**: 1265-1285.

McManus, B. (2007). "Nonlinear pricing in an oligopoly market: the case of specialty coffee." RAND Journal of Economics **38**(2): 512-532.

Mertens, Y. and V. Ginsburgh (1985). "Product differentiation and price discrimination in the European community. The case of automobiles." Journal of Industrial Economics **34**(2): 151-166.

Nevo, A. (2001). "Measuring market power in the ready-to-eat cereal industry." Econometrica **69**(2): 307-342.

Pigou, A. (1920). The Economics of Welfare. London, Macmillan.

Reid, D. (1998). How to make more money from your accommodation business. Yield Management for small to medium-sized accommodation operators. Hobart, Tourism Tasmania.

Reid, G. (1993). Small Business Enterprise. An Economic Analysis. London, Routledge.

Robinson, J. (1933). The Economics Of Imperfect Competition. London, Macmillan.

Roeger, W. (1995). "Can imperfect competition explain the difference between primal and dual productivity measures. Estimates for U.S. manufacturing." Journal of Political Economy **103**(2): 316-330.

Rogers, M. (1999). "The performance of small and medium enterprises: An overview using the growth and performance survey." Melbourne Institute Working Paper(No. 1/99): 1-28.

Schmalensee, R. (1981). "Output and welfare implications of monopolistic third-degree price discrimination." American Economic Review **71**(1): 242-247.

Schmalensee, R. (1985). "Do markets differ much?" American Economic Review **75**(3): 341-351.

Schmalensee, R. (1988). "Industrial economics: an overview." Economic Journal **98**: 643-681.

Shepard, A. (1991). "Price discrimination and retail configuration." Journal of Political Economy **99**(1): 90-53.

Stole, L. (2007). Price discrimination and competition. Handbook of Industrial Organization., M. Armstrong and R. Porter. North-Holland, Elsevier. **3**.

Tasmanian Visitor Survey, Tourism Tasmania, Quarter ending reports, Sept 2000 to June 2005.

Tourism Operators Survey, Tourism Tasmania, 1993, 1994 and 1998.

Tirole, J. (1988). The Theory of Industrial Organization. Cambridge, Massachusetts, The MIT Press.

Uebersax JS. (2006) The tetrachoric and polychoric correlation coefficients. Statistical Methods for Rater Agreement web site. Available at: <http://john-uebersax.com/stat/tetra.htm> . Viewed on 6 February 2012.

Varian, H. (1989). Price Discrimination. Handbook of Industrial Organization. R. Schmalensee and R. D. Willig. North-Holland, Elsevier **1**.

Verboven, F. (1996). "International price discrimination in the European car market." RAND Journal of Economics **27**(2): 240-268.

Verboven, F. (2002). "Quality based price discrimination and tax incidence: evidence from gasoline and diesel cars." RAND Journal of Economics **33**(2): 275-297.

Ville, S. and D. Merrett (2006). "A time series for profitability in twentieth century Australia." Australian Economic Review **39**(3): 330-339.

Weiss, L. (1971). Quantitative Studies of Industrial Organization. Amsterdam, North-Holland.

Appendix 1 Map showing the ABS region boundaries.

Tourism Regions, Tasmania—2010

Based on ASGC 2010 edition, applying to tourism surveys conducted during the 2011 calendar year



Source: Australian Bureau of Statistics, June 2005.

Appendix 2 Map showing the SABD region boundaries.



Source: Tourism Tasmania, August 2005. Viewed at <http://www.about-australia.com/maps/tasmania/June 2005>

Appendix 3 Industry representatives and organisations

Stage 1 - Development of the draft questionnaire

1. Michael Roberts, General Manager, Tourism Industry Council Tasmania
2. Amanda Walsh, Research Manager, Tourism Tasmania
3. Daniel Hanna, Australian Hotels Association, Tasmania Branch.

Stage 1 - Testing the draft questionnaire in the semi-structured interviews

1. Ian Rankine, Chief Executive, Innkeepers, Hobart – tourist accommodation retailer
2. Gail Murray, Manager Sales and Marketing, Tasmania's Temptations – tourist accommodation wholesaler
3. Len Cuff, Director, Distribution Manager, Tourism Tasmania
4. Tanya Hanson, Manager Electronic Business, Distribution, Tourism Tasmania
5. Daniel Leesong, General Manager, Tourism industry Council Tasmania
6. Daniel Hanna, Australian Hotels Association, Tasmania Branch
7. Gina Scott, Chair, Bed and Breakfast and Boutique Accommodation of Tasmania
8. Three tourist accommodation business operators who cannot be identified for privacy reasons

Stage 2 –Pilot survey organisations providing business contacts

1. Bed and Breakfast and Boutique Accommodation
2. Tourism Industry Council Tasmania
3. Australian Hotels Association, Tasmania Branch

Stage 2 Post-pilot survey discussions

1. Daniel Hanna, General Manager, Tourism Industry Council Tasmania
2. Pam von Steiglitz, Head of Distribution, Tourism Tasmania
3. Associate Professor Malcolm Wells, School of Management, UTAS
4. David Reid (through Malcolm Wells), author of the 1998 Yield Management Study
5. Professor Trevor Sofield, School of Management, UTAS

Appendix 4 Survey questionnaire

Survey of Tourist Accommodation Operators 2008

Welcome to the online questionnaire for this survey of tourist accommodation operators.

An electronic copy of the questionnaire has also been emailed to you so that you can browse the questionnaire before starting to complete it. This copy can also be used to record your answers as you complete the online questionnaire.

You can use the Save Page and Continue Later option to save a partially completed questionnaire. You will need to complete the page you are viewing before saving. You will then be asked to confirm your email and a link will be sent to you so that you can re-start the questionnaire. When you click on the link it will take you to the next page in the questionnaire.

There are forty three questions in total in the questionnaire. Fourteen of these are skip questions which you may not need to answer.

Please read the notes where a question mark appears at the end of a question. *(These have been attached to the back of this electronic copy).*

Leave answer boxes blank where you have no response or data to enter.

If exact figures are not available, please provide careful estimates.

Where a question refers to a typical summer week this should fall in the quarter ending 31 March 2008. Where a question refers to a typical winter week this should fall in the quarter ending 30 September 2007.

Consent form

The University of Tasmania requires your formal consent before you start this questionnaire.

Please read through the following points and then tick the box at the bottom of the page if you agree to participate.

- (i) I have read and understood the letter of introduction dated the 2 June 2008 for this study.
- (ii) The nature and possible effects of the study have been explained to me.
- (iii) I understand that the study involves completing an online questionnaire which will take approximately 25 to 30 minutes.
- (iv) I understand that there are no foreseeable risks involved in answering the questions.
- (v) I understand that all research data will be securely stored in the School of Economics and Finance password protected computer of Ann Marsden for five years from the date of publication of the findings of the research, and then deleted from the computer.
- (vi) Any questions that I have asked have been answered to my satisfaction.
- (vii) I agree that research data gathered from me for the study may be published provided that I or my organization cannot be identified as a participant.
- (viii) I understand that my identity will be kept confidential and that any information I supply to the researcher will be used only for the purposes of the research.
- (ix) I agree to participate in this investigation and understand that I may withdraw at any time without any effect.

I have read the consent points (i) to (ix) and by ticking the following the box consent to participate in this survey. Please press continue to start the questionnaire.

☐ Yes

Please provide the name of the person completing the questionnaire and the name of the business.

--

General questions about this business

1. What position do you currently occupy in this business?

- ☐ Chief executive officer
- ☐ Business manager
- ☐ Marketing manager
- ☐ Financial controller
- ☐ Front desk manager
- ☐ Owner operator

2. How many years has this business been operating under the present owner?

- ☐ Less than 1 year
- ☐ 1 year and up to 3 years
- ☐ 3 years and up to 5 years
- ☐ More than 5 years

3. How important are the following in measuring the success of this business?

	Very important	Important	Neutral	Not very important	Not important
Financial performance					
Customer satisfaction					
Market share					

4. Are there any other ways that the success of this business is measured?

- ☐ Yes
- ☐ No

5. Could you provide brief details of the other ways that the success of this business is measured.

--

6. Are you the owner operator of this business?

☐ Yes

☐ No

7. How important were the following in motivating your decision to operate this business?

	Very important	Important	Neutral	Not very important	Not important
To make a living					
To make a lifestyle change					

8. Were there any other motivators that were important in your decision to operate this business?

☐ Yes

☐ No

9. Could you provide brief details of the other motivators that were important in your decision to operate this business.

--

General questions about pricing in this business

10. Who makes the pricing decisions in this business?

- ☐ Chief executive officer
- ☐ Business manager
- ☐ Marketing manager
- ☐ Financial controller
- ☐ Front desk manager
- ☐ Owner operator

11. How important are the following factors in the pricing decisions made in this business?

	Very important	Important	Neutral	Not very important	Not important
Fairness to the customer					
Market share growth					
Reputation of the business					
Profitability of the business					

12. Are there any other factors which are important to this business when making pricing decisions?

- ☐ Yes
- ☐ No

13. Could you provide brief details of the other factors that are important in the pricing decisions of this business.

Sales and percentage discount from the rack rate for this business

14. Please estimate the number of guest nights sold by distribution channel at the rack rate and below the rack rate in a typical summer week. Please also estimate the average percentage discount from the rack rate received by guests in a typical summer week.

	Number of sales at rack rate per summer week	Number of sales below rack rate per summer week	Average percentage discount on sales below rack rate
Wholesalers and online aggregators			
Retailers and online intermediaries			
Direct via own website, telephone or fax			
Direct via walk-ins			

15. Please estimate the number of guest nights sold by distribution channel at the rack rate and below the rack rate in a typical winter week. Please also estimate the average percentage discount from the rack rate received by guests in a typical winter week.

	Number of sales at rack rate per winter week	Number of sales below rack rate per winter week	Average percentage discount on sales below rack rate
Wholesalers and online aggregators			
Retailers and online intermediaries			
Direct via own website, telephone or fax			
Direct via walk-ins			

16. Please estimate the number of corporate and leisure guest nights sold at the rack rate and the number sold below the rack rate in a typical summer week. Please also estimate the average percentage discount from the rack rate received by guests in a typical summer week.

	Number of sales at rack rate per summer week	Number of sales below rack rate per summer week	Average percentage discount on sales below rack rate
Corporate nights			
Leisure nights			

17. Please estimate the number of corporate and leisure guest nights sold at the rack rate and the number sold below the rack rate in a typical winter week. Please also estimate the average percentage discount from the rack rate received by guests in a typical winter week.

	Number of sales at rack rate per winter week	Number of sales below rack rate per winter week	Average percentage discount on sales below rack rate
Corporate nights			
Leisure nights			

18. Please estimate the number of return visit and first-visit guest nights sold at the rack rate and the number sold below the rack rate in a typical summer week. Please also estimate the average percentage discount from the rack rate received by guests in a typical summer week.

	Number of sales at rack rate per summer week	Number of sales below rack rate per summer week	Average percentage discount on sales below rack rate
Return visit nights			
First-visit nights			

19. Please estimate the number of return visit and first-visit guest nights sold at the rack rate and the number sold below the rack rate in a typical winter week. Please also estimate the average percentage discount from the rack rate received by guests in a typical winter week.

	Number of sales at rack rate per winter week	Number of sales below rack rate per winter week	Average percentage discount on sales below rack rate
Return visit nights			
First visit nights			

Effect of increase in rack rates on accommodation takings for this business

20. How would you expect your accommodation takings to change if you increased your rack rates by 10% for those customers purchasing using these distribution channels in a typical summer week?

	Increase in takings	No appreciable change in takings	1% to 10% fall in takings	More than 10% fall in takings
Wholesalers and online aggregators				
Retailers and online intermediaries				
Direct via own website, telephone or fax				
Direct via walk-ins				

21. How would you expect your accommodation takings to change if you increased your rack rates by 10% for those customers purchasing using these distribution channels in a typical winter week?

	Increase in takings	No appreciable change in takings	1% to 10% fall in takings	More than 10% fall in takings
Wholesalers and online aggregators				
Retailers and online intermediaries				
Direct via own website, telephone or fax				
Direct via walk-ins				

22. How would you expect your accommodation takings to change if you increased your rack rates by 10% for corporate and leisure customers in a typical summer week?

	Increase in takings	No appreciable change in takings	1% to 10% fall in takings	More than 10% fall in takings
Corporate customer				
Leisure customer				

23. How would you expect your accommodation takings to change if you increased your rack rates by 10% for corporate and leisure customers in a typical winter week?

	Increase in takings	No appreciable change in takings	1% to 10% fall in takings	More than 10% fall in takings
Corporate customer				
Leisure customer				

24. How would you expect your accommodation takings to change if you increased your rack rates by 10% for return visit and first-visit customers in a typical summer week?

	Increase in takings	No appreciable change in takings	1% to 10% fall in takings	More than 10% fall in takings
Return visit customer				
First-visit customer				

25. How would you expect your accommodation takings to change if you increased your rack rates by 10% for return visit and first-visit customers in a typical winter week?

	Increase in takings	No appreciable change in takings	1% to 10% fall in takings	More than 10% fall in takings
Return visit customer				
First-visit customer				

Costs of guest nights sold for this business

26. Apart from commission, does the cost of selling a guest night vary according to which distribution channel is used to sell the night?

☐ Yes

☐ No

27. Could you assess the cost of selling a guest night for each of these distribution channels relative to the cost of selling a guest night directly to walk-in customers in a typical summer week?

	More than 10% higher than walk-ins	1% to 10% higher than walk-ins	Same as cost of walk-ins	1% to 10% lower than walk-ins	More than 10% lower than walk-ins
Wholesalers and online aggregators					
Retailers and online intermediaries					
Direct via own website, telephone or fax					

28. Could you also assess the cost of selling a guest night for each of these distribution channels relative to the cost of selling a guest night directly to walk-in customers in a typical winter week?

	More than 10% higher than walk-ins	1% to 10% higher than walk-ins	Same as cost of walk-ins	1% to 10% lower than walk-ins	More than 10% lower than walk-ins
Wholesalers and online aggregators					
Retailers and online intermediaries					
Direct via own website, telephone or fax					

29. Apart from commission, does the cost of selling a guest night vary according to whether the customer is a business or leisure customer?

☐ Yes

☐ No

30. Could you assess the cost of selling a corporate guest night relative to the cost of selling a leisure guest night in a typical summer week?

	More than 10% higher than leisure night	1% to 10% higher than leisure night	1% to 10% lower than leisure night	More than 10% lower than leisure night
Corporate night				

31. Could you assess the cost of selling a corporate guest night relative to the cost of selling a leisure guest night in a typical winter week?

	More than 10% higher than leisure night	1% to 10% higher than leisure night	1% to 10% lower than leisure night	More than 10% lower than leisure night
Corporate night				

32. Apart from commission, does the cost of selling a guest night vary according to whether the customer is a return visit customer or first visit customer?

☐ Yes

☐ No

33. Could you assess the cost of selling a return visit guest night relative to the cost of selling a first-visit guest night in a typical summer week?

	More than 10% higher than first visit night	1% to 10% higher than first visit night	1% to 10% lower than first visit night	More than 10% lower than first visit night
Return visit night				

34. Could you assess the cost of selling a return visit guest night relative to the cost of selling a first-visit guest night in a typical winter week?

	More than 10% higher than first visit night	1% to 10% higher than first visit night	1% to 10% lower than first visit night	More than 10% lower than first visit night
Return visit night				

Return on assets and equity for this business

35. What was your return on assets before interest and taxes for the following quarters?

	Less than 3%	3% to 5%	6% to 7%	8% to 10%	More than 10%
Return on assets before interest and taxes for quarter ending 31 March 2008 (Summer)					
Return on assets before interest and taxes for quarter ending 30 September 2007 (Winter)					

36. Were there any significant factors that affected your return on assets before interest and taxes during the quarter ending 31 March 2008 or the quarter ending 30 September 2007?

☐ Yes

☐ No

37. Could you provide brief details of any significant factors that affected your return on assets before interest and taxes for the quarter ending 31 March 2008 or the quarter ending 30 September 2007.

38. What was your return on equity before interest and taxes for the following quarters?

	Less than 4%	5% to 7%	8% to 9%	10% to 12%	More than 12%
Return on equity before interest and taxes for quarter ending 31 March 2008 (Summer)					
Return on equity before interest and taxes for quarter ending 30 September 2007 (Winter)					

39. Were there any significant factors that affected your return on equity before interest and taxes during the quarter ending 31 March 2008 or the quarter ending 30 September 2007?

☐ Yes

☐ No

40. Could you provide brief details of any significant factors that affected your return on equity before interest and taxes for the quarter ending 31 March 2008 or the quarter ending 30 September 2007.

Competitive position of this business

41. In terms of just your close competitors, how competitive was your industry in the quarter ending 31 March 2008 and the quarter ending 30 September 2007.

	Very competitive	Competitive	Neutral	Not very competitive	Not competitive at all
Degree of competition during quarter ending 31 March 2008 (Summer)					
Degree of competition during quarter ending 30 September 2007 (Winter)					

42. Were there any significant factors that affected competitiveness in your industry during the quarter ending 31 March 2008 or the quarter ending 30 September 2007?

☐ Yes

☐ No

43. Could you provide brief details of any significant factors that affected competitiveness in your industry for the quarter ending 31 March 2008 or the quarter ending 30 September 2007.



You have now reached the end of the questions. Thank you for completing the questionnaire. The results of the survey will be made available to participants as soon as the analysis is complete.

Help text for answering questions

Question 14. Wholesalers and online aggregators are those distributors who take 18% and more commission. Examples include Tasmania's Temptations and Expedia.

Retailers and online intermediaries are those distributors who take less than 18% commission. Examples include Jetset Travel and Wotif.com.

You should allocate every guest night to one of the distribution channels.

For instance if you sold 60 guest nights in a week through wholesalers and online aggregators your data might look like this;

Wholesalers and online aggregators - 50 guest nights sold at rack rate and 10 below rack rate with an average percentage discount on those guest nights sold below the rack rate of 10%.

Sales at the rack rate and below the rack rate refers to the price the customer pays and not the rate the business receives after commission has been deducted.

Guest nights should include children occupying beds and all paying guests. They should exclude babies in cots and non-paying guests/staff.

The summer week should fall in the quarter ending 31 March 2008.

Question 15. Wholesalers and online aggregators are those distributors who take 18% and more commission. Examples include Tasmania's Temptations and Expedia.

Retailers and online intermediaries are those distributors who take less than 18% commission. Examples include Jetset Travel and Wotif.com.

You should allocate every guest night to one of the distribution channels.

For instance if you sold 40 guest nights in a week through wholesalers and online aggregators your data might look like this;

Wholesalers and online aggregators - 30 guest nights sold at rack rate and 10 below rack rate with an average percentage discount on those guest nights sold below the rack rate of 15%.

Sales at the rack rate and below the rack rate refers to the price the customer pays and not the rate the business receives after commission has been deducted.

Guest nights should include children occupying beds and all paying guests. They should exclude babies in cots and non-paying guests/staff.

The winter week should fall in the quarter ending 30 September 2007.

Question 16. Corporate nights should be guest nights where evidence of corporate eligibility has been provided. Corporate nights should also include guest nights arising from conference bookings. Leisure nights should be all other guest nights.

You should allocate every guest night to one of these two customer groups.

For instance if you sold 100 guest nights in a week to corporate customers your data might look like this;

Corporate - 80 guest nights sold at rack rate and 20 below rack rate with an average percentage discount on those guest nights sold below the rack rate of 2%.

Sales at the rack rate and below the rack rate refers to the price the customer pays and not the rate the business receives after commission has been deducted.

Guest nights should include children occupying beds and all paying guests. They should exclude babies in cots and non-paying guests/staff.

The summer week should fall in the quarter ending 31 March 2008.

Question 17. Corporate nights should be guest nights where evidence of corporate eligibility has been provided. Corporate nights should also include guest nights arising from conference bookings. Leisure nights should be all other guest nights.

You should allocate every guest night to one of these two customer groups.

For instance if you sold 60 guest nights in a week to corporate customers your data might look like this;

Corporate - 50 guest nights sold at rack rate and 10 below rack rate with an average percentage discount on those guest nights sold below the rack rate of 5%.

Sales at the rack rate and below the rack rate refers to the price the customer pays and not the rate the business receives after commission has been deducted.

Guest nights should include children occupying beds and all paying guests. They should exclude babies in cots and non-paying guests/staff.

The winter week should fall in the quarter ending 30 September 2007.

Question 18. Return visit nights should be those guest nights where the visitor has made a previous visit to your accommodation. First visit nights should be all other guest nights.

You should allocate every guest night to one of these two customer groups.

For instance if you sold 40 guest nights in a week to return visit guests your data might look like this;

Return visit nights - 30 guest nights sold at rack rate and 10 below rack rate with an average percentage discount on those guest nights sold below the rack rate of 8%.

Sales at the rack rate and below the rack rate refers to the price the customer pays and not the rate the business receives after commission has been deducted.

Guest nights should include children occupying beds and all paying guests. They should exclude babies in cots and non-paying guests/staff.

The summer week should fall in the quarter ending 31 March 2008.

Question 19. Return visit nights should be those guest nights where the visitor has made a previous visit to your accommodation. First visit nights should be all other guest nights.

You should allocate every guest night to one of these two customer groups.

For instance if you sold 30 guest nights in a week to return visit guests your data might look like this;

Return visit nights - 25 guest nights sold at rack rate and 5 below rack rate with an average percentage discount on those guest nights sold below the rack rate of 4%.

Sales at the rack rate and below the rack rate refers to the price the customer pays and not the rate the business receives after commission has been deducted.

Guest nights should include children occupying beds and all paying guests. They should exclude babies in cots and non-paying guests/staff.

The winter week should fall in the quarter ending 30 September 2007.

Question 20. Wholesalers and online aggregators are those distributors who take 18% and more commission. Examples include Tasmania's Temptations and Expedia.

Retailers and online intermediaries are those distributors who take less than 18% commission. Examples include Jetset Travel and Wotif.com.

Accommodation takings should include gross takings (including GST) derived from the provision of accommodation only.

Accommodation takings should exclude takings from shops, kiosks, restaurants, bars, laundries.

Where accommodation, meals or other revenue are a combined total, only the proportion allocated to accommodation should be considered when answering this question.

The summer week should fall in the quarter ending 31 March 2008.

Question 21. Wholesalers and online aggregators are those distributors who take 18% and more commission. Examples include Tasmania's Temptations and Expedia.

Retailers and online intermediaries are those distributors who take less than 18% commission. Examples include Jetset Travel and Wotif.com.

Accommodation takings should include gross takings (including GST) derived from the provision of accommodation only.

Accommodation takings should exclude takings from shops, kiosks, restaurants, bars, laundries.

Where accommodation, meals or other revenue are a combined total, only the proportion allocated to accommodation should be considered when answering this question.

The winter week should fall in the quarter ending 30 September 2007.

Question 22. Corporate nights should be guest nights where evidence of corporate eligibility has been provided. Corporate nights should also include guest nights arising from conference bookings. Leisure nights should be all other guest nights.

Accommodation takings should include gross takings (including GST) derived from the provision of accommodation only.

Accommodation takings should exclude takings from shops, kiosks, restaurants, bars, laundries.

Where accommodation, meals or other revenue are a combined total, only the proportion allocated to accommodation should be considered when answering this question.

The summer week should fall in the quarter ending 31 March 2008.

Question 23. Corporate nights should be guest nights where evidence of corporate eligibility has been provided. Corporate nights should also include guest nights arising from conference bookings. Leisure nights should be all other guest nights.

Accommodation takings should include gross takings (including GST) derived from the provision of accommodation only.

Accommodation takings should exclude takings from shops, kiosks, restaurants, bars, laundries.

Where accommodation, meals or other revenue are a combined total, only the proportion allocated to accommodation should be considered when answering this question.

The winter week should fall in the quarter ending 30 September 2007.

Question 24. Return visit customers should be those customers who have made a previous visit to your accommodation. First visit customers should be all other customers.

Accommodation takings should include gross takings (including GST) derived from the provision of accommodation only.

Accommodation takings should exclude takings from shops, kiosks, restaurants, bars, laundries.

Where accommodation, meals or other revenue are a combined total, only the proportion allocated to accommodation should be considered when answering this question.

The summer week should fall in the quarter ending 31 March 2008.

Question 25. Return visit customers should be those customers who have made a previous visit to your accommodation. First visit customers should be all other customers.

Accommodation takings should include gross takings (including GST) derived from the provision of accommodation only.

Accommodation takings should exclude takings from shops, kiosks, restaurants, bars, laundries.

Where accommodation, meals or other revenue are a combined total, only the proportion allocated to accommodation should be considered when answering this question.

The winter week should fall in the quarter ending 30 September 2007.

Question 26. You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

Question 27. For instance if the cost of selling a night via a wholesaler was \$55 and the cost of selling a walk-in night was \$50 then the cost would be 10% higher via the wholesaler.

You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

All cost estimates should exclude commission.

Wholesalers and online aggregators are those distributors who take 18% and more commission. Examples include Tasmania's Temptations and Expedia.

Retailers and online intermediaries are those distributors who take less than 18% commission. Examples include Jetset Travel and Wotif.com.

The summer week should fall in the quarter ending 31 March 2008.

Question 28. For instance if the cost of selling a night via a wholesaler was \$55 and the cost of selling a walk-in night was \$50 then the cost would be 10% higher via the wholesaler.

You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

All cost estimates should exclude commission.

Wholesalers and online aggregators are those distributors who take 18% and more commission. Examples include Tasmania's Temptations and Expedia.

Retailers and online intermediaries are those distributors who take less than 18% commission. Examples include Jetset Travel and Wotif.com.

The winter week should fall in the quarter ending 30 September 2007.

Question 29. You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

Question 30. For instance if the cost of selling a corporate night was \$60 and the cost of selling a leisure night was \$50 then the cost would be 20% higher for the corporate night.

You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

All cost estimates should exclude commission.

Corporate nights should be guest nights where evidence of corporate eligibility has been provided. Corporate nights should also include guest nights arising from conference bookings. Leisure nights should be all other guest nights.

The summer week should fall in the quarter ending 31 March 2008.

Question 31. For instance if the cost of selling a corporate night was \$60 and the cost of selling a leisure night was \$50 then the cost would be 20% higher for the corporate night.

You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

All cost estimates should exclude commission.

Corporate nights should be guest nights where evidence of corporate eligibility has been provided. Corporate nights should also include guest nights arising from conference bookings. Leisure nights should be all other guest nights.

The winter week should fall in the quarter ending 30 September 2007.

Question 32. You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

Question 33. For instance if the cost of selling a return visit night was \$42 and the cost of selling a first visit night was \$50 then the cost would be 16% lower for the return visit night.

You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

All cost estimates should exclude commission.

Return visit nights should be those guest nights where the visitor has made a previous visit to your accommodation. First visit nights should be all other guest nights.

The summer week should fall in the quarter ending 31 March 2008.

Question 34. For instance if the cost of selling a return visit night was \$42 and the cost of selling a first visit night was \$50 then the cost would be 16% lower for the return visit night.

You should consider only those costs that would not be incurred if the room was empty for the night e.g. room cleaning, linen, credit card charges.

All cost estimates should exclude commission.

Return visit nights should be those guest nights where the visitor has made a previous visit to your accommodation. First-visit nights should be all other guest nights.

The winter week should fall in the quarter ending 30 September 2007.

Question 35. For instance if net profit before interest and taxes was \$50,000 and total assets were \$800,000 then the return on assets would be;

$$(50,000/800,000)*100 = 6.25\%$$

Please round your return on assets to the nearest whole number.

Question 38. For instance if net profit before interest and tax was \$50,000 and net equity were \$400,000 then the return on equity would be;

$$(50,000/400,000)*100 = 12.5\%$$

Net equity is total assets minus total liabilities.

Please round your return on equity to the nearest whole number.

Question 41. You should consider only those firms that you regard as close competitors i.e. those firms that are similar in quality and price range.

Appendix 5 Pilot survey letter of introduction

Dear operator,

I would like to invite your participation in a pilot survey, which is being carried out as part of my PhD studies with the School of Economics and Finance at the University of Tasmania, under the supervision of Dr Hugh Sibly. I am investigating the way that firms providing accommodation in the Tasmanian tourism industry carry out their pricing. Recent work in economics suggests that where firms can successfully divide up their market then they can offer prices around the indicative price (rack rate), and increase their profitability. The amount of information that firms have about their customers and the information that customers have about tourist accommodation appears to be critical to the success of firms in pricing around the indicative price.

You are one of 50 firms in the tourism industry that has been selected from publicly available information to participate in this pilot survey. This pilot survey will be followed up with a full survey at a later stage. In the interests of getting the best information from the full survey, I am asking you to participate in this pilot survey. A contribution from you now offers the prospect of enhanced understanding of the industry and better individual performance in the future. Once the pilot survey is completed and the data analysed then the findings will be communicated to firms in the industry.

The pilot survey involves a questionnaire, which will ask about how you divide up your market (if you do), the price sensitivity of your different market segments and how the use of this information affects your profitability and occupancy rates. The questionnaire will be administered by myself and will take about an hour to complete. If you decide to participate then your responses to the questionnaire will be completely anonymous and will be treated confidentially. The analysis of the data will not allow for identification of a particular business. To ensure this anonymity I will reduce detail in the information to make it difficult for firms to be identified. I will also minimize the likelihood of spontaneous recognition by removing unusual characteristics of firms which would enable recognition of that business. I will also avoid matching datasets which could lead to identification of firms.

The data from the study will be stored in my School of Economics password protected computer for five years from the date of publication of the findings of the research and then deleted from the computer.

Your participation in this survey is entirely voluntary, and evidenced by signing a consent form at the time of participation. In any event, you can withdraw from the survey at any point without effect or explanation.

The study has received ethical approval from the Human Research Ethics Committee (Tasmania) Network. If you have any concerns or complaints of an ethical nature concerning

how the study is conducted, you may contact the Executive Officer of the Network, Amanda McAully (Ph 62 26 2763; email: Amanda.McAully@utas.edu.au).

If you would like more information about the study before you make a commitment to participate please do not hesitate to contact me on the following number 6324 2921 or by email at ann.marsden@utas.edu.au. I will be contacting you in about a week to see if you would like to participate in the pilot survey.

Thank you in advance for considering this invitation.

Ann Marsden

Appendix 6 Survey letter of introduction

Dear operator,

Survey of Short-Stay Accommodation Operators in Tasmania 2008

I am writing to let you know about a study of pricing in the tourist accommodation industry in Tasmania. The study is being carried out as part of my PhD studies with the School of Economics and Finance at the University of Tasmania, under the supervision of Dr Hugh Sibly. The study is supported by the Tourism Industry Council Tasmania, the Australian Hotels Association (Tasmanian branch), the Bed and Breakfast and Boutique Accommodation of Tasmania and Tourism Tasmania.

I would like to invite your participation in the study. This will involve the completion of an online questionnaire, which should take you about 25 to 30 minutes. You can complete it in one session, or a number of sessions to minimise disruption to your business. I will send you a link to the questionnaire during the next week.

The questionnaire covers questions about pricing and sales in your market. Recent work in economics suggests that where firms can successfully segment their market they can offer a mix of prices (at the rack rate and below the rack rate) and increase their profitability. I want the study to add to this work and to contribute to a better understanding of the tourist accommodation industry. I plan to communicate the findings of the study to the industry so you will be able to take advantage of these for your own business.

Your responses to the questionnaire will be completely anonymous and will be treated confidentially. The analysis of the data will not allow for identification of a particular business. To ensure this anonymity I will reduce detail in the information to make it difficult for firms to be identified. I will also minimise the likelihood of spontaneous recognition by removing unusual characteristics of firms which would enable recognition of that business. I will also avoid matching datasets which could lead to identification of firms.

The data from the survey will be stored in my School of Economics and Finance password protected computer for five years from the date of publication of the findings of the research and then deleted from the computer.

Your participation in this survey is entirely voluntary, and evidenced by agreeing to the consent form at the front of the questionnaire before participation. In any event, you can withdraw from the survey at any point without effect or explanation.

The study has received ethical approval from the Human Research Ethics Committee (Tasmania) Network. If you have any concerns or complaints of an ethical nature concerning how the study is conducted, you may contact the Executive Officer of the Network on 6226 7479 or at human.ethics@utas.edu.au.

If you would like more information about the study before you make a commitment to participate, please do not hesitate to contact me on the following number 6324 3272 or by email at ann.marsden@utas.edu.au.

Thank you in advance for considering this invitation.

Yours sincerely,

Ann Marsden

Appendix 7 Region groupings for Table 5.1

<u>SABD Region</u>	<u>Simplified region</u>
Derwent Valley and Central Highlands	Northern
Freycinet and the East Coast	Southern
Heritage Highway	Central
Devonport, Cradle Mountain, Gt Western Tiers	Northern
Flinders Island	Northern
Hobart and Surrounds	Southern
King Island	Northern
Launceston and Tamar Valley	Central
St Helens and the Northeast	Northern
Stanley and the North West	Northern
Strahan and the West Coast	Central
Huon Dentrecaesteaux Bruny	Southern
Tasman Peninsula and the South East	Southern

Appendix 8 Region groupings for Table 5.14

<u>SABD Region</u>	<u>Simplified region</u>
Derwent Valley and Central Highlands	Derwent
Freycinet and the East Coast	Derwent
Heritage Highway	Derwent
Devonport, Cradle Mountain, Gt Western Tiers	Devonport
Flinders Island	Flinders
Hobart and Surrounds	Hobart
King Island	King
Launceston and Tamar Valley	Launceston
St Helens and the Northeast	Sthelens
Stanley and the North West	Stanley
Strahan and the West Coast	Stanley
Huon Dentrecaesteaux Bruny	Tasman
Tasman Peninsula and the South East	Tasman

Appendix 9 Difference in post-commission prices, elasticity, marginal cost variables and re-ordered elasticity variable

The estimation of equation 6.10 requires the construction of a number of variables namely; difference in post-commission price, elasticities and marginal cost variables. Since the price and elasticity data from the survey is in the levels, difference variables need to be constructed from this data. The marginal cost data from the survey is expressed in differences but requires transformation to an ordered variable for the econometric analysis.

A9.1 Construction of pre-commission and post-commission prices

The data on rack rate prices extracted from the Discover Tasmania website and the responses to questions 14 to 19 is first used to calculate the pre-commission price and post-commission price for each of the eight customer groups. These groups are the distribution channel the customer uses and whether the customer is a corporate, leisure, return visit or first-visit customer. The rack rate can be considered to be the maximum a firm could charge for a guest night. Many business operators have a range of different rooms and a range of rack rates. The responses that business operators provided to questions 14 to 19 reflect the mix of rooms and rack rates in the business. A weighted rack rate is therefore calculated using the data from the Discover Tasmania site for each business to reflect this mix. The weighted rack rate is called the *full price guest night*. An example is shown in table A9.1. Revenue for each type of room is first calculated assuming full occupancy. Total revenue for all rooms is then divided by the number of guests that the business operator could accommodate in the rooms. This calculation generates the *full price guest night*.

Table A9.1 Full price guest night calculation

Type of room	Number of rooms	Price of room	Revenue
Ensuite	22	145	3190
Studio	4	160	640
Total revenue			3830
Guest nights			71
<i>full price guest night</i>			53.94

The *full price guest night* and the data generated from questions 14 to 19 is then used to calculate the price of a guest night before commission is deducted. This price is called the *pre-commission price*. The data from questions 14 to 19 provides the number of guest night sales at and below the rack rate, and the percentage discount from the rack rate for those sales

below the rack rate for each business. The calculation of the *pre-commission price* is shown in Table A9.2 where the *full price guest night* is carried forward from Table A9.1. In the example in Table A9.2 there are 2 sales at a price of \$53.94 and 5 discounted sales at \$45.86 which gives an average *pre-commission price* of \$48.16. Since the revenue that the business receives from the sale of a guest night reflects post-commission prices rather than pre-commission prices the *pre-commission price* is then adjusted downwards for the commission and this is called *post commission price*. Post-commission prices are generated for the eight customer groups.

Table A9.2

<i>full price guest night</i>	Sales at rack rate	Sales below rack rate	Percentage discount on sales below rack rate	<i>pre-commission price</i>	<i>post-commission price</i>
\$53.94	2	5	15%	\$48.16	\$36.12

A9.2 Construction of the difference in post-commission price variable

The percentage difference between the *post-commission prices* of the a selected groups and base groups are then calculated by taking the *post-commission price* for a particular group relative to the post-commission price for a base group. The selected groups are the wholesaler, retailer, web, corporate and return-visit groups. The base groups are the door, leisure and first-visit groups. These are consistent with the selected groups and base groups used to generate the marginal cost data in questions 26 to 34. The example in Table A9.3 illustrates this calculation for the distribution channel groups. In this example the wholesaler *post-commission price* is 18.5% lower, the retailer *post-commission price* 3% higher and the web *post-commission price* 10.4% lower than door *post-commission price*. The percentage differences are then transformed to logarithms for the purposes of the estimation of equation 6.10.

Table A9.3

<i>Post-commission price</i>				Percentage difference		
wholesalers	retailers	web	door	wholesalers relative to door	retailers relative to door	web relative to door
\$36.12	\$45.64	\$39.70	\$44.31	-18.5%	3.0%	-10.4%

A9.3 Construction of the difference in elasticities variable

The data on elasticities comes from questions 20 to 25. Respondents have a choice of four possible responses in answering these questions. The difference in elasticities variable calculated for the estimation of equation 6.10 is an ordered response variable but with five possible points. Table A9.4 sets out the first step in the calculation of the difference in elasticity variable. A value of 3 from the questionnaire indicates a 1% to 10% fall in takings and a value of 2 indicates no appreciable change in takings when the rack rate increases by 10%. In the example in Table A9.4 this means that customers purchasing via wholesalers or retailers are more responsive than those purchasing via the firms website or direct at the door of the business. Taking the difference between the response for the door, a value of 2, and the response for the wholesalers, a value of 2 generates a difference of -1. Taking the difference between the web, a value of 2, and the door, a value of 2, generates a difference of zero.

Table A9.4

Question response from questionnaire				Difference in ranking from door		
wholesalers	retailers	web	door	difflastwholesalers	difflastretailers	difflastweb
3	3	2	2	-1	-1	0

The second step in is to re-code the difference in elasticities values to create a set of positive points for estimation. An example of the full set of possible re-coded responses for the wholesalers relative to the door is shown in Table A9.5. A value of 4 means that the selected group has a larger elasticity than that of the base group, a value of 2 means that the selected group has a smaller elasticity than that of the base group and a value of 3 means no differences in the elasticity of demand between the selected group and the base group.

Table A9.5

	d1difflast	d2difflast	d3difflast	d4difflast	d5difflast
Difference in ranking from door	2	1	0	-1	-2
Recoding of difference in ranking from door	1	2	3	4	5

A9.4 Construction of the difference in marginal cost variable

The data on marginal costs comes from questions 26 to 34. In comparison to the questions about prices and elasticities these questions capture difference in marginal cost rather than absolute marginal cost. The selected groups for these difference responses are the wholesaler, retailer, web, corporate and leisure groups. The base groups are the door, leisure and first-visit groups.¹⁴⁶ In the questionnaire a response of 5 means that the marginal cost of a guest night for the selected group is more than 10% lower than that for the base group. The questionnaire responses for the marginal cost questions are re-coded for ease of interpretation of the estimation results. A response of 5 for example is re-coded so that it takes a value of 1. By re-coding the responses the lower values of 1 and 2 in the scaling reflect lower marginal costs of the selected group relative to the base group and the higher values of 4 and 5 in the scaling reflect higher marginal costs of the selected group relative to the base group. Where marginal costs are the same for the selected and base groups the response is 3 in the questionnaire and the re-ordered response. An example of the re-coding is shown in Table A9.6.

Table A9.6

Questionnaire response	Re-ordered question response	d1diffmargcost	d2diffmargcost	d3diffmargcost	d4diffmargcost	d5diffmargcost
5	1	1	0	0	0	0

¹⁴⁶ Respondents are asked about the difference in the marginal cost of a guest night for a selected group and base group. The responses are; more than 10% higher, between 1% and 10% higher, the same, between 1 and 10% lower and more than 10% lower.

A9.5 Construction of the *elasticityorder* variable

The elasticityorder variable is generated from the elasticity values from the survey. The elasticity value for the summer door channel is used as the base for re-ordering the elasticity values from the three other channels, wholesaler, retailer and web. Table A9.7 shows examples of this re-ordering. For Firm A the door summer value is 2 which now takes a value of 4. The value of 4 is selected for the re-basing in order to ensure all new values are positive. The wholesaler summer value of 3 relative to the door summer value of 2 generates a re-ordered wholesaler summer value of 5.

Table A9.7

	wholesaler summer	door summer	Re-ordered wholesaler summer	Re-ordered door
Firm A	3	2	5	4
Firm B	4	4	4	4
Firm C	1	2	3	4
Firm D	3	1	6	4

Appendix 10 Cut points for the estimates in Table 6.4, Table 7.1 and Table 8.2.

Chapter 6 - Table 6.4 cut points					Chapter 7 - Table 7.1 cut points		Chapter 8 - Table 8.2 cut points		
Dependent variable	A <i>diffelast</i>	B <i>diffelast</i>	C <i>diffelast</i>	D <i>diffelast</i>	Dependent variable	B <i>elasticityorder</i>	Dependent variable	A <i>assets</i>	B <i>assets</i>
cut1 _cons	-1.856*** (-9.66)	-1.826*** (-10.06)	-1.641*** (-7.89)	-2.259*** (-5.64)	cut1 _cons	-2.458*** (-3.56)	cut1 _cons	-0.302 (-0.71)	-1.511** (-3.23)
cut2 _cons	-1.089*** (-8.06)	-1.057*** (-8.90)	-1.112*** (-7.14)	-0.987*** (-5.30)	cut2 _cons	-1.729** (-2.61)	cut2 _cons	0.738 (1.74)	-0.604 (-1.34)
cut3 _cons	0.853*** (6.70)	0.881*** (7.80)	0.982*** (6.56)	0.781*** (4.37)	cut3 _cons	0.0162 (0.02)	cut3 _cons	1.247** (2.84)	0.204 (0.47)
cut4 _cons	1.832*** (10.08)	1.859*** (10.80)	1.979*** (8.66)	1.764*** (6.50)	cut4 _cons	0.762 (1.15)	cut4 _cons	1.318** (2.97)	
					cut5 _cons	1.289 (1.91)			

t statistics in parentheses

* p<0.05 ** p<0.01 *** p<0.001

Appendix 11 Derivation of equation 7-6

$$\ln p_j(1 - \gamma_j) = \ln c_j(\mathbf{X}_2) + \alpha_1 d_j \quad 7-4$$

$$d_j(p_j, \varphi, \mathbf{X}_1) = \eta_1(\ln p_j) + \eta_2(\overline{\varphi P_j}) + \eta_3 \mathbf{X}_1 \quad 7-5$$

Substituting equation 7-5 into 7-4 gives

$$\ln p_j(1 - \gamma_j) = \ln c_j(\mathbf{X}_2) + \alpha_1 \left\{ \eta_1(\ln p_j) + \eta_2(\overline{\varphi P_j}) + \eta_3 \mathbf{X}_1 \right\}$$

$$\ln p_j + \ln(1 - \gamma_j) = \ln c_j(\mathbf{X}_2) + \alpha_1 \eta_1 \ln p_j + \alpha_1 \eta_2(\overline{\varphi P_j}) + \alpha_1 \eta_3 \mathbf{X}_1$$

$$\ln p_j - \alpha_1 \eta_1 \ln p_j = \ln c_j(\mathbf{X}_2) + \alpha_1 \eta_2(\overline{\varphi P_j}) + \alpha_1 \eta_3 \mathbf{X}_1 - \ln(1 - \gamma_j)$$

$$(1 - \alpha_1 \eta_1) \ln p_j = \ln c_j(\mathbf{X}_2) + \alpha_1 \eta_2(\overline{\varphi P_j}) + \alpha_1 \eta_3 \mathbf{X}_1 - \ln(1 - \gamma_j)$$

$$\begin{aligned} \ln p_j = & \left(\frac{1}{1 - \alpha_1 \eta_1} \right) \ln c_j(\mathbf{X}_2) + \left(\frac{\alpha_1 \eta_2}{1 - \alpha_1 \eta_1} \right) (\overline{\varphi P_j}) \\ & + \left(\frac{\alpha_1 \eta_3}{1 - \alpha_1 \eta_1} \right) \mathbf{X}_1 - \left(\frac{1}{1 - \alpha_1 \eta_1} \right) \ln(1 - \gamma_j) \end{aligned}$$

Appendix 12 Estimation results for return on equity equation

A		B	
<u>Dependent variable</u>	<i>equity</i>	<u>Dependent variable</u>	<i>equity</i>
<i>noofrooms</i>	-0.0112 (-1.55)		
<i>star35less</i>	0.409 (0.96)	<i>star35less</i>	0.0772 (0.20)
<i>competition</i>	0.370 (0.94)		
<i>propdoor</i>	0.0146 (1.47)		
<i>wotif</i>	0.432 (1.00)	<i>wotif</i>	0.910* (2.25)
		<i>lifestyle</i>	-1.280*** (-3.41)
<i>winter</i>	-1.005** (-3.05)	<i>winter</i>	-1.310*** (-3.68)
cut1		cut1	
_cons	-0.080 (-0.16)	_cons	-1.534** (-3.21)
cut2		cut2	
_cons	0.731 (1.40)	_cons	-0.638 (-1.47)
cut3		cut3	
_cons	1.095* (2.08)	_cons	-0.181 (-0.43)
cut4		cut4	
_cons	1.689** (3.11)	_cons	0.391 (0.90)
	N = 53	N	N = 46

z statistics in parentheses

* p<0.05 ** p<0.01 ***p<0.001